5Order No. MAC0512114C1

Service Manual

Air Conditioner

CS-E9EKK CU-E9EKK
CS-E12EKK CU-E12EKK

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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1 Safety Precaution

- Read the following “SAFETY PRECAUTIONS” carefully before perform any servicing.
- Electrical work must be installed or serviced by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation or servicing due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

⚠ **WARNING**	This indication shows the possibility of causing death or serious injury.

⚠ **CAUTION**	This indication shows the possibility of causing injury or damage to properties.

- The items to be followed are classified by the symbols:

⃠	This symbol denotes item that is PROHIBITTED from doing.

- Carry out test running to confirm that no abnormality occurs after the servicing. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

⚠ **WARNING**	
1. Engage dealer or specialist for installation and servicing. If installation or servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
2. Install according to this installation instruction strictly. If installation is defective, it will cause water leakage, electrical shock or fire.	
3. Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.	
4. Install at a strong and firm location which is able to withstand the set’s weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.	
5. For electrical work, follow the local national wiring standard, regulation and the installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.	
6. Use the specified cable and connect tightly for indoor/outdoor connection. Connect tightly and clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat-up or fire at the connection.	
7. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electrical shock.	
8. When connecting the piping, do not allow air or any substances other than the specified refrigerant to enter the refrigeration cycle. Otherwise, this may lower the capacity, cause abnormally high pressure in the refrigeration cycle, and possibly result in explosion and injury.	⃠
9. Thickness of copper pipes used must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.	⃠
10. It is desirable that the amount of residual oil is less than 40 mg/10 m.	⃠
11. Do not modify the length of the power supply cord or use of the extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it will cause fire or electrical shock.	⃠

⚠ CAUTION

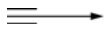
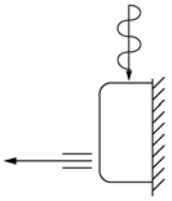
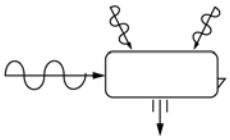
1. The equipment must be earthed. It may cause electrical shock if grounding is not perfect.
2. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.
3. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
4. Pb free solder has a higher melting point than standard solder; typically the melting point is 50 - 70°F (30 - 40°C) higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C).Pb free solder will tend to splash when heated too high (about 1100°F/600°C).

ATTENTION

1. Selection of the installation location. Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.
2. Power supply connection to the conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following methods.
   Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency.
   In some countries, permanent connection of this room air conditioner to the power supply is prohibited.
   1. Power supply connection to the receptacle using a power plug. Use an approved power plug with earth pin for the connection to the socket.
   2. Power supply connection to a circuit breaker for the permanent connection. Use an approved circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.5 mm contact gap.
3. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
4. Installation work. It may need two people to carry out the installation work.
5. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.

2 Specifications

2.1. CS-E9EKK CU-E9EKK

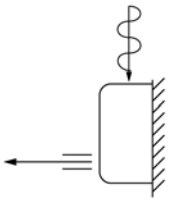
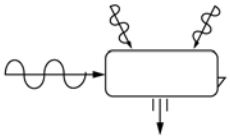
		Unit	CS-E9EKK	CU-E9EKK
Performance Test Condition			CSA	
Cooling Capacity		kW (BTU/h)	2.60 (1.20 - 3.00) 8,900 (4,100 - 10,200)	
Heating Capacity		kW (BTU/h)	3.65 (1.20 - 4.85) 12,500 (4,100 - 16,500)	
Moisture Removal		l/h Pint/h	0.9 1.9	
Power Source (Phase, Voltage, Cycle)		ø V Hz	Single 208 - 230 60	
Airflow Method		OUTLET  INTAKE 	SIDE VIEW 	TOP VIEW 
Air Volume	Lo	m^3/min (cfm)	Cooling; 6.2 (220) Heating; 6.6 (230)	—
	Me	m^3/min (cfm)	Cooling; 7.9 (280) Heating; 8.6 (300)	—
	Hi	m^3/min (cfm)	Cooling; 7.8 (280) Heating; 8.8 (310)	Cooling; 31.0 (1,090)
	SHi	m^3/min (cfm)	Cooling; 9.9 (350) Heating; 10.8 (380)	—
Noise Level		dB (A)	Cooling; High 40, Low 28 Heating; High 42, Low 29	Cooling; 45 - 47 Heating; 46 - 48
		Power level dB	Cooling; High 51 - 51 Heating; High 53 - 53	Cooling; High 58 - 60 Heating; High 59 - 61
Electrical Data	Input	W	Cooling; 650 (250 - 800) Heating; 1,000 (250 - 1,300)	
	Running Current	A	Cooling; 3.5 - 3.0 Heating; 5.3 - 4.6	
	EER	W/W (BTU/hW)	Cooling; 4.0 (13.69)	
	COP	W/W (BTU/hW)	Heating; 3.65 (12.50)	
	Starting Current	A	5.3	
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 3/8” L ; Half Union 1/4”	G ; 3-way valve 3/8” L ; 2-way valve 1/4”
Pipe Size (Flare piping)		inch inch	G ; (gas side) 3/8” L ; (liquid side) 1/4”	G ; (gas side) 3/8” L ; (liquid side) 1/4”
Drain Hose	Inner diameter	mm	16	—
	Length	mm	0.65	—
Power Cord Length		m	—	—
Number of core-wire			—	—

			Unit	CS-E9EKK	CU-E9EKK
Dimensions	Height		inch (mm)	11 - 1/32 (280)	21 - 1/4 (540)
	Width		inch (mm)	31 - 15/32 (799)	30 - 23/32 (780)
	Depth		inch (mm)	7 - 7/32 (183)	11 - 3/8 (289)
Net Weight			lb (kg)	20 (9.0)	82 (37)
Compressor		Type		—	Hermetic Motor
	Motor	Type		—	Brushless (6-pole)
	Rated	Output	kW	—	700
Air Circulation		Type		Cross-flow Fan	Propeller Fan
		Material		ASG20k1	P.P
	Motor	Type		Transistor (8-poles)	Induction (6-poles)
		Input	W	46.0 - 46.0	61.3
		Rated Output	W	30	29
	Fan Speed	Lo (Cool/Heat)	rpm	880/930	—
		Me (Cool/Heat)	rpm	1,100/1,200	—
		Hi (Cool/Heat)	rpm	1,320/1,460	740-820/680-770
		SHi (Cool/Heat)	rpm	1,360/1,490	—
Heat Exchanger	Description			Evaporator	Condenser
	Tube material			Copper	Copper
	Fin material			Aluminium (Pre Coat)	Aluminium
	Fin Type			Slit Fin	Corrugated Fin
	Row/Stage			(Plate fin configuration, forced draft)	
				2 / 15	2 / 24
	FPI			21	17
	Size (W × H × L)		mm	25.4 × 315 × 610	36.4 × 504 × 718.4: 689.8
Refrigerent Control Device				—	Capillary Tube
Refrigeration Oil			(cm^3)	—	RB68A (400)
Refrigerant (R410A)			g (oz)	—	950 (23.5)
Thermostat				Electronic Control	—
Protection Device				—	Electronic Control
Air Filter	Material Style			P.P. Honeycomb	—

Note

- Specifications are subject to change without notice for further improvement.

2.2. CS-E12EKK CU-E12EKK

		Unit	CS-E12EKK	CU-E12EKK
Performance Test Condition			CSA	
Cooling Capacity		kW (BTU/h)	3.35 (1.20 - 3.85) 11,500 (4,100 - 13,100)	
Heating Capacity		kW (BTU/h)	4.70 (1.20 - 6.20) 16,000 (4,100 - 21,000)	
Moisture Removal		l/h Pint/h	1.3 2.7	
Power Source (Phase, Voltage, Cycle)		ø V Hz	Single 208 - 230 60	
Airflow Method		OUTLET INTAKE 	SIDE VIEW 	TOP VIEW 
Air Volume	Lo	m^3/min (cfm)	Cooling; 6.9 (240) Heating; 8.1 (290)	—
	Me	m^3/min (cfm)	Cooling; 8.8 (310) Heating; 9.7 (340)	—
	Hi	m^3/min (cfm)	Cooling; 8.8 (310) Heating; 9.5 (340)	Cooling; 31.0 (1,090)
	SHi	m^3/min (cfm)	Cooling; 11.0 (390) Heating; 11.6 (410)	—
Noise Level		dB (A)	Cooling; High 43, Low 31 Heating; High 44, Low 35	Cooling; 45 - 47 Heating; 47 - 49
		Power level dB	Cooling; High 54 - 54 Heating; High 55 - 55	Cooling; High 58 - 60 Heating; High 60 - 62
Electrical Data	Input	W	Cooling; 1,000 (250 - 1,150) Heating; 1,450 (250 - 1,900))	
	Running Current	A	Cooling; 5.2 - 4.6 Heating; 7.3 - 6.5	
	EER	W/W (BTU/hW)	Cooling; 3.35 (11.50)	
	COP	W/W (BTU/hW)	Heating; 3.24 (11.03)	
	Starting Current	A	7.3	
Piping Connection Port (Flare piping)		inch inch	G ; Half Union 1/2” L ; Half Union 1/4”	G ; 3-way valve 1/2” L ; 2-way valve 1/4”
Pipe Size (Flare piping)		inch inch	G ; (gas side) 1/2” L ; (liquid side) 1/4”	G ; (gas side) 1/2” L ; (liquid side) 1/4”
Drain Hose	Inner diameter	mm	16	—
	Length	mm	0.65	—
Power Cord Length Number of core-wire		m	— —	— —
Dimensions	Height	inch (mm)	11 - 1/32 (280)	21 - 1/4 (540)
	Width	inch (mm)	31 - 15/32 (799)	30 - 23/32 (780)
	Depth	inch (mm)	7 - 7/32 (183)	11 - 3/8 (289)
Net Weight		lb (kg)	20 (9.0)	82 (37)

			Unit	CS-E12EKK	CU-E12EKK
Compressor		Type		—	Hermetic Motor
	Motor	Type		—	Brushless (6-pole)
	Rated	Output	kW	—	700
Air Circulation		Type		Cross-flow Fan	Propeller Fan
		Material		ASG20K1	P.P
	Motor	Type		Transistor (8-poles)	Induction (6-poles)
		Input	W	46.0 - 46.0	61.3
		Rated Output	W	30	29
	Fan Speed	Lo (Cool/Heat)	rpm	960/1,150	—
		Me (Cool/Heat)	rpm	1,220/1,360	—
		Hi (Cool/Heat)	rpm	1,450/1,560	740-820/690-780
		SHi (Cool/Heat)	rpm	1,490 /1,590	—
Heat Exchanger	Description			Evaporator	Condenser
	Tube material			Copper	Copper
	Fin material			Aluminium (Pre Coat)	Aluminium
	Fin Type			Slit Fin	Corrugated Fin
	Row/Stage			(Plate fin configuration, forced draft)	
				2 / 15	2 / 24
	FPI			21	17
	Size (W × H × L)		mm	25.4 × 315 × 610	36.4 × 504 × 718.4: 689.8
Refrigerent Control Device				—	Capillary Tube
Refrigeration Oil			(cm^3)	—	RB68A (400)
Refrigerant (R410A)			g (oz)	—	950 (23.5)
Thermostat				Electronic Control	—
Protection Device				—	Electronic Control
Air Filter	Material Style			P.P. Honeycomb	—

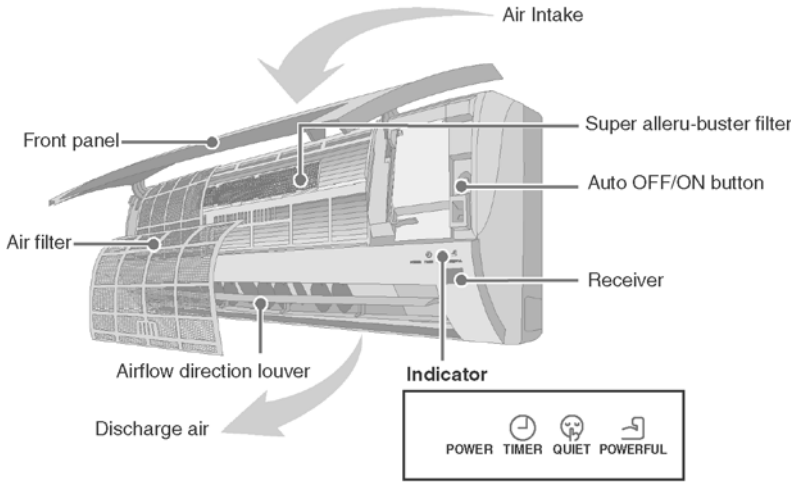
Note

- Specifications are subject to change without notice for further improvement.

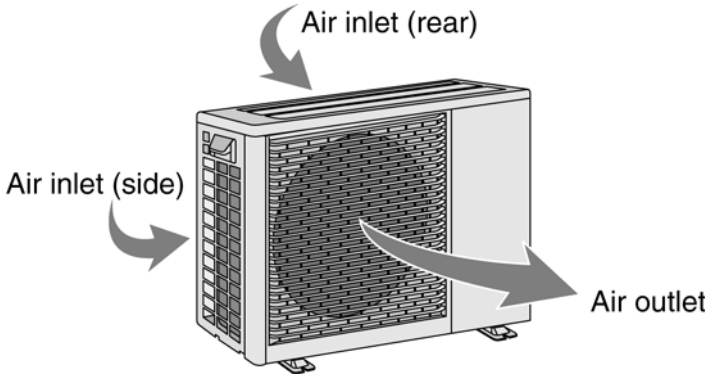
3 Location of Controls and Components

3.1. Product Overview

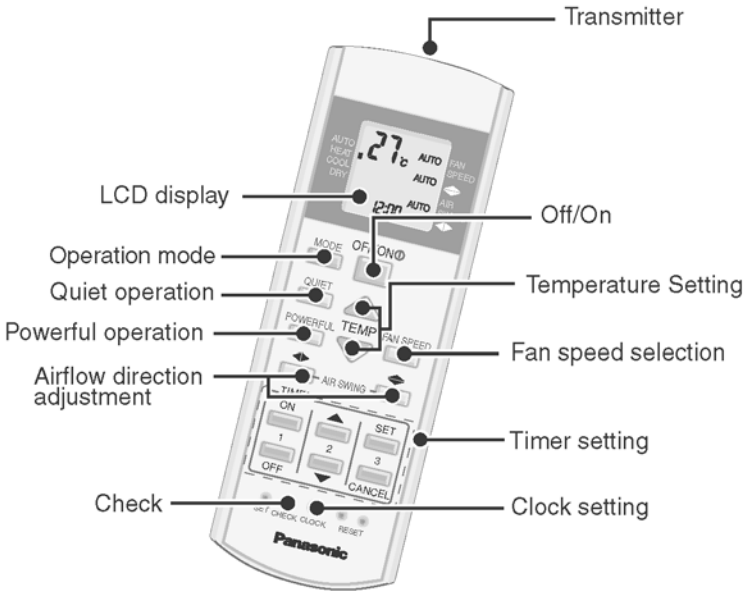
3.1.1. Indoor Unit



3.1.2. Outdoor Unit



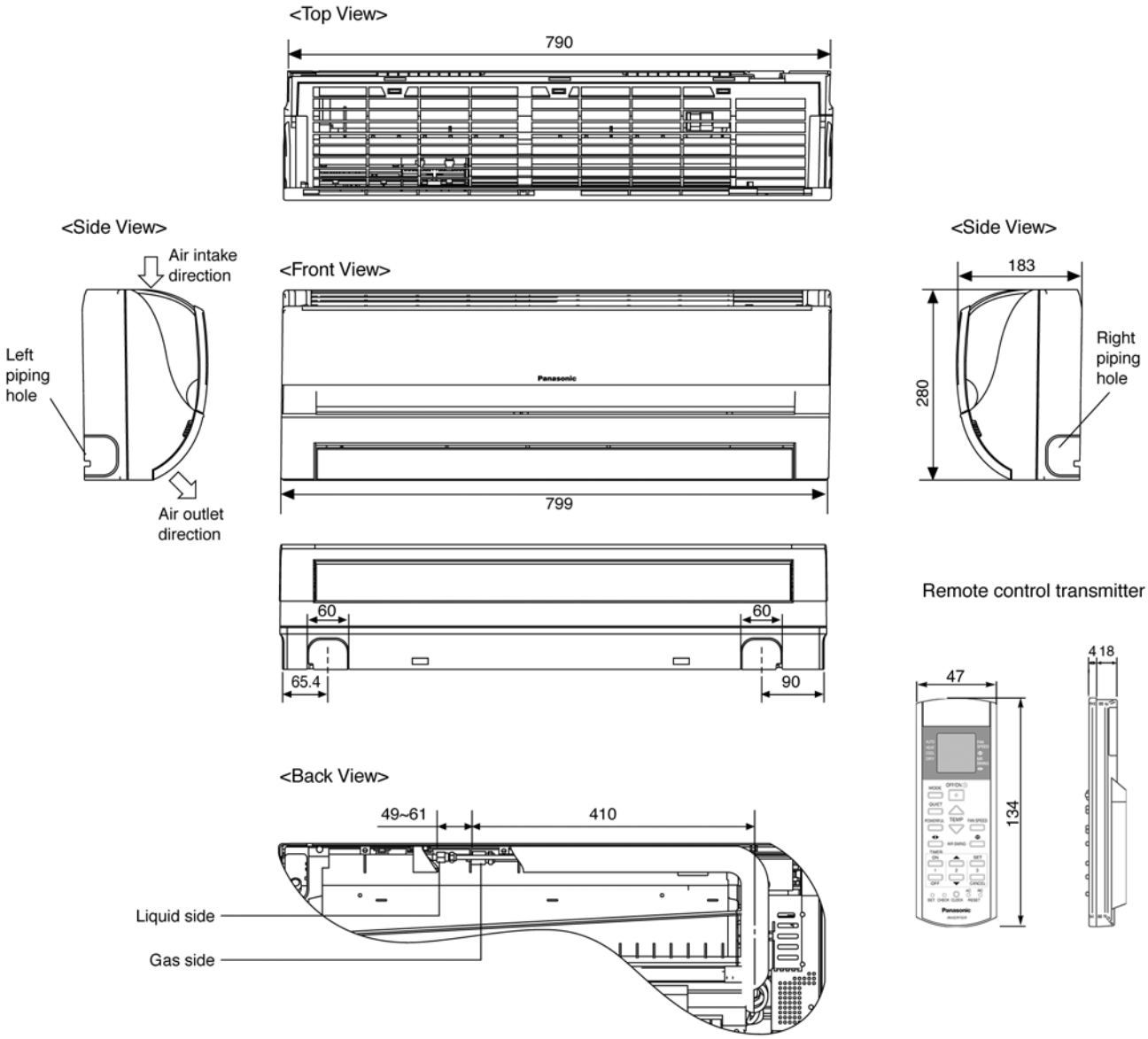
3.1.3. Remote Control



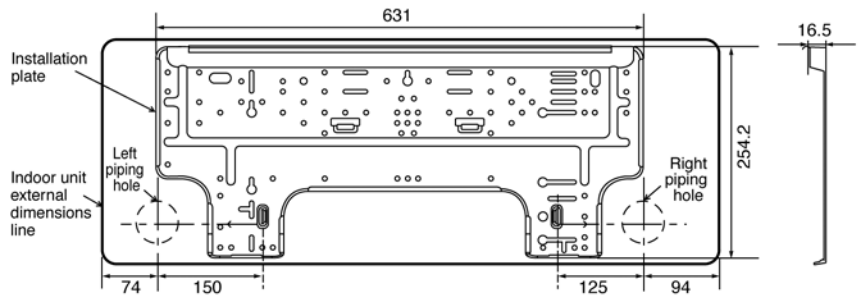
* For normal operation, the SET button is not in use.
* Press RESET button to restore the remote control's default setting.

4 Dimensions

4.1. Indoor Unit

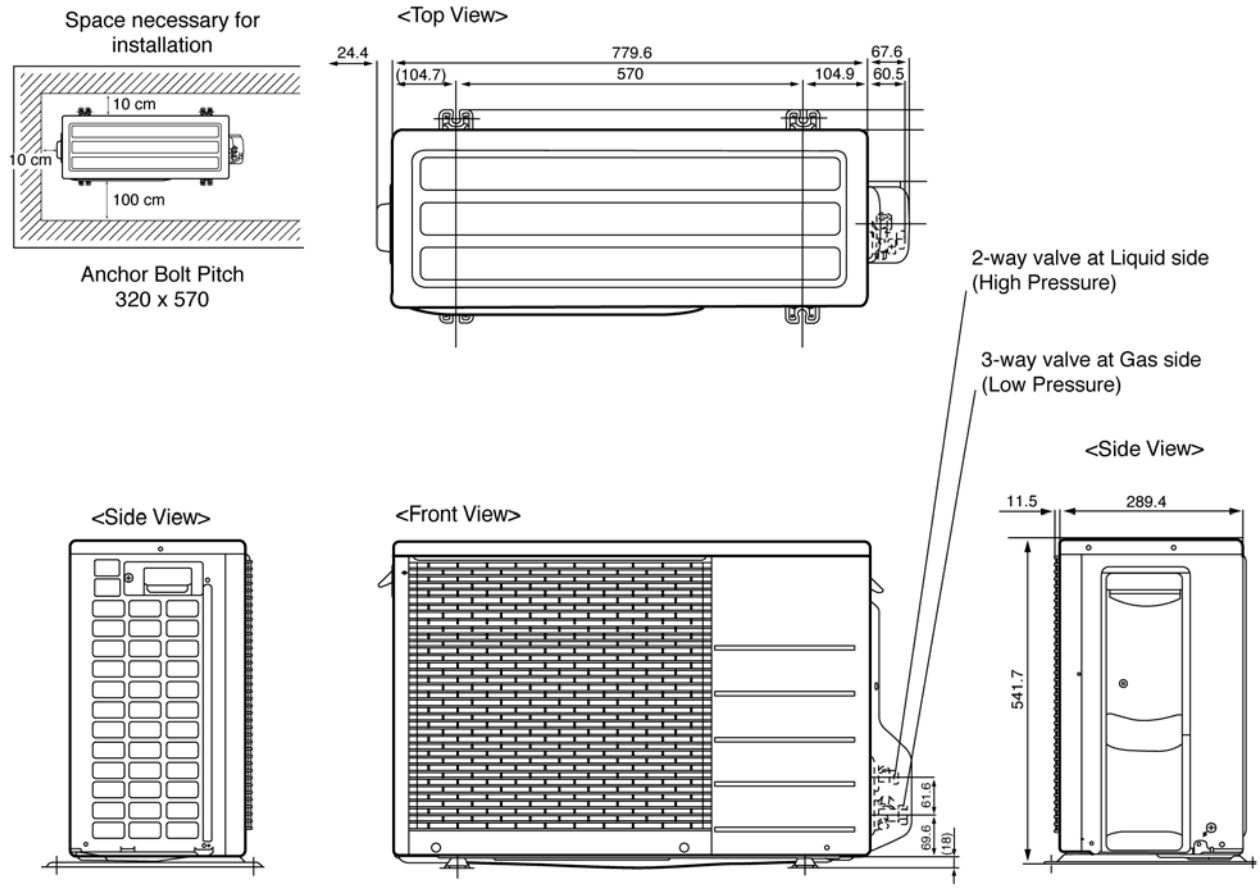


Relative position between the indoor unit and the installation plate <Front View>



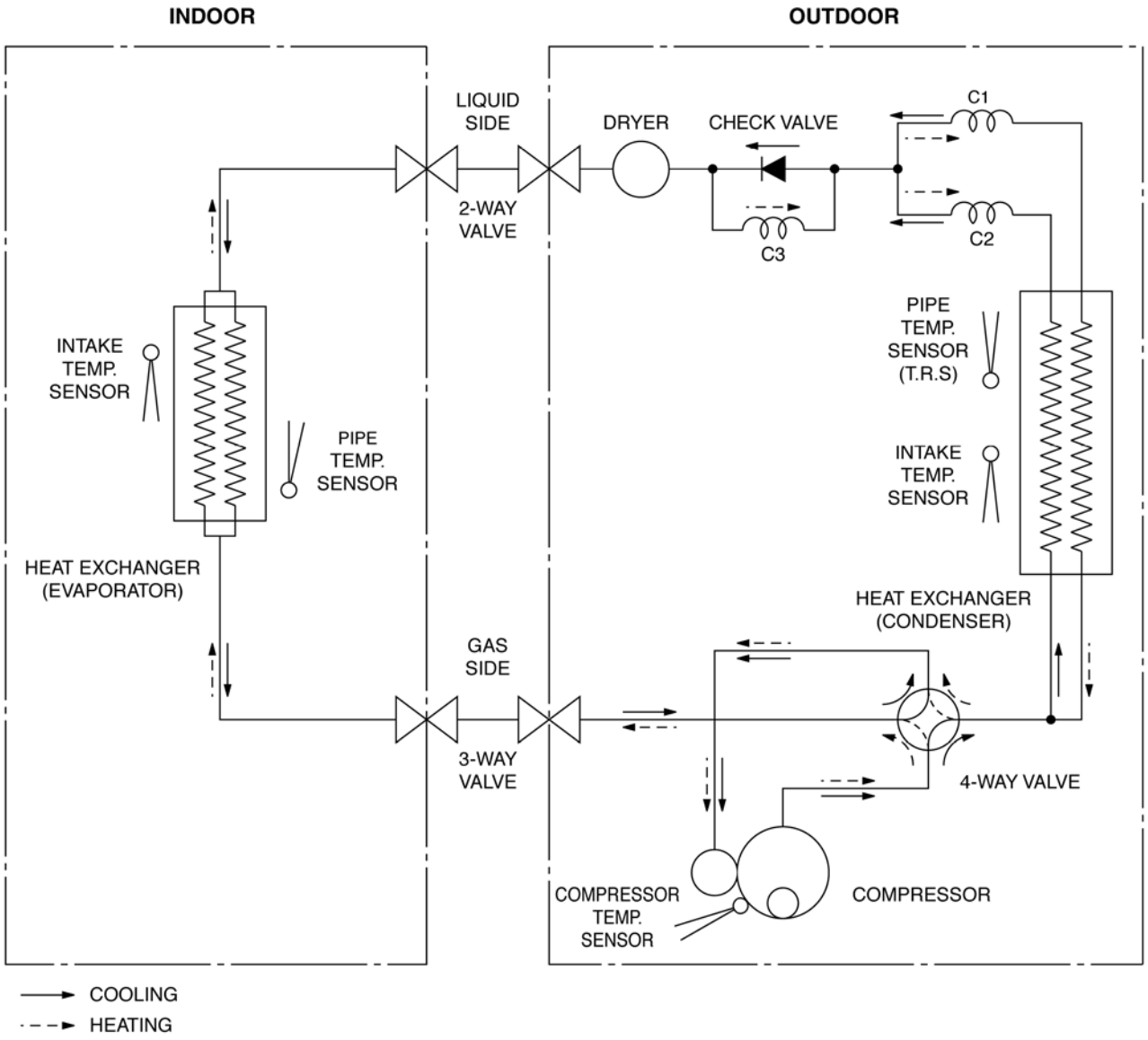
Unit : mm

4.2. Outdoor Unit

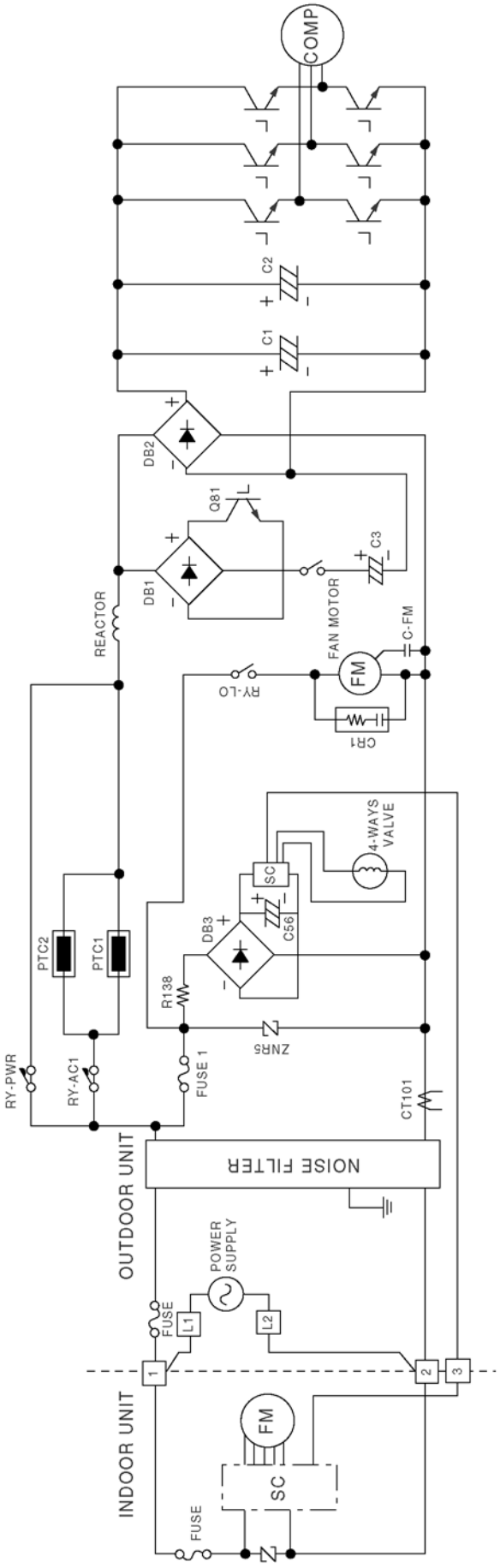


Unit: mm

5 Refrigeration Cycle Diagram

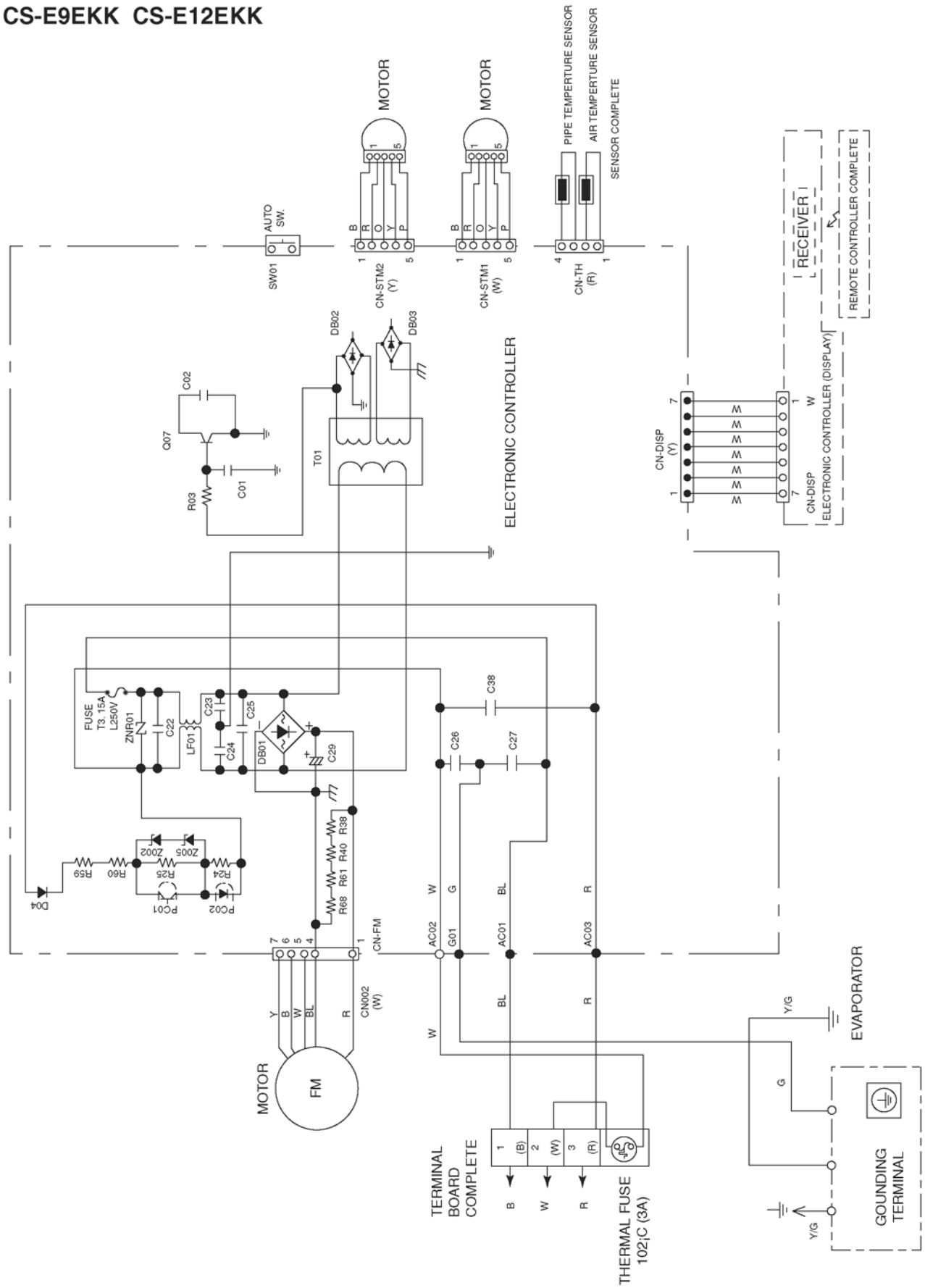


6 Block Diagram

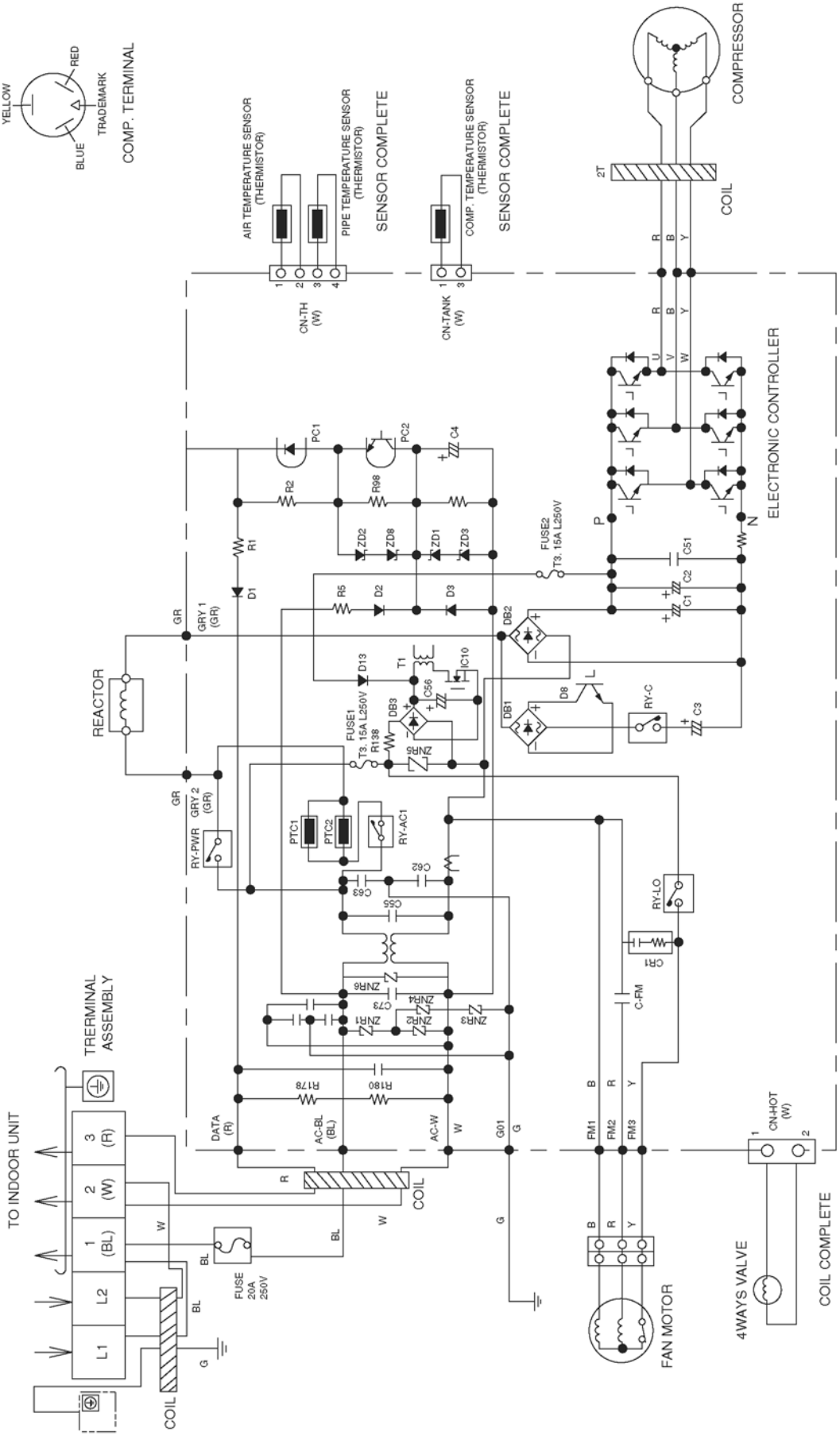


7 Wiring Connection Diagram

CS-E9EKK CS-E12EKK

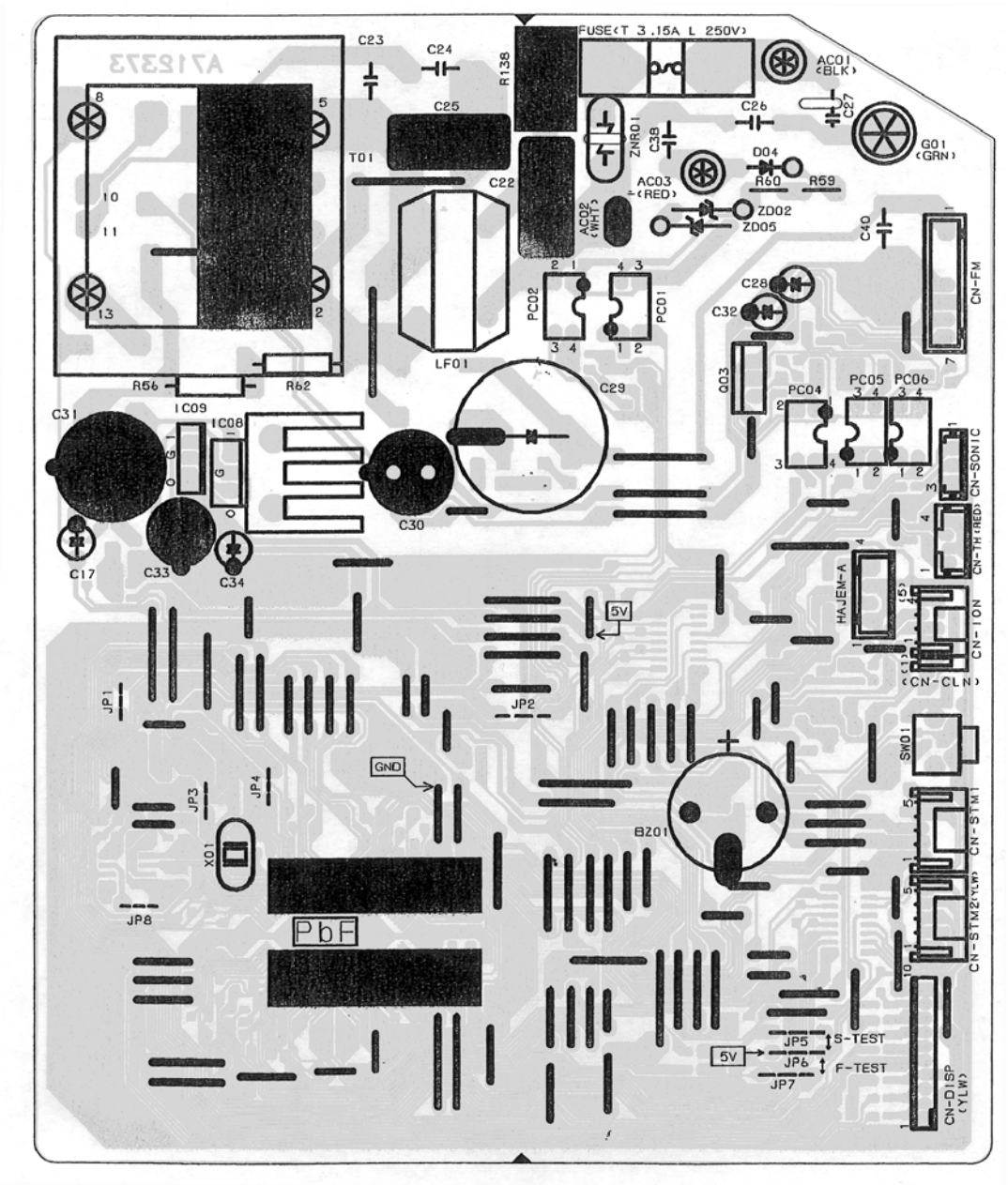


CU-E9EKK CU-E12EKK

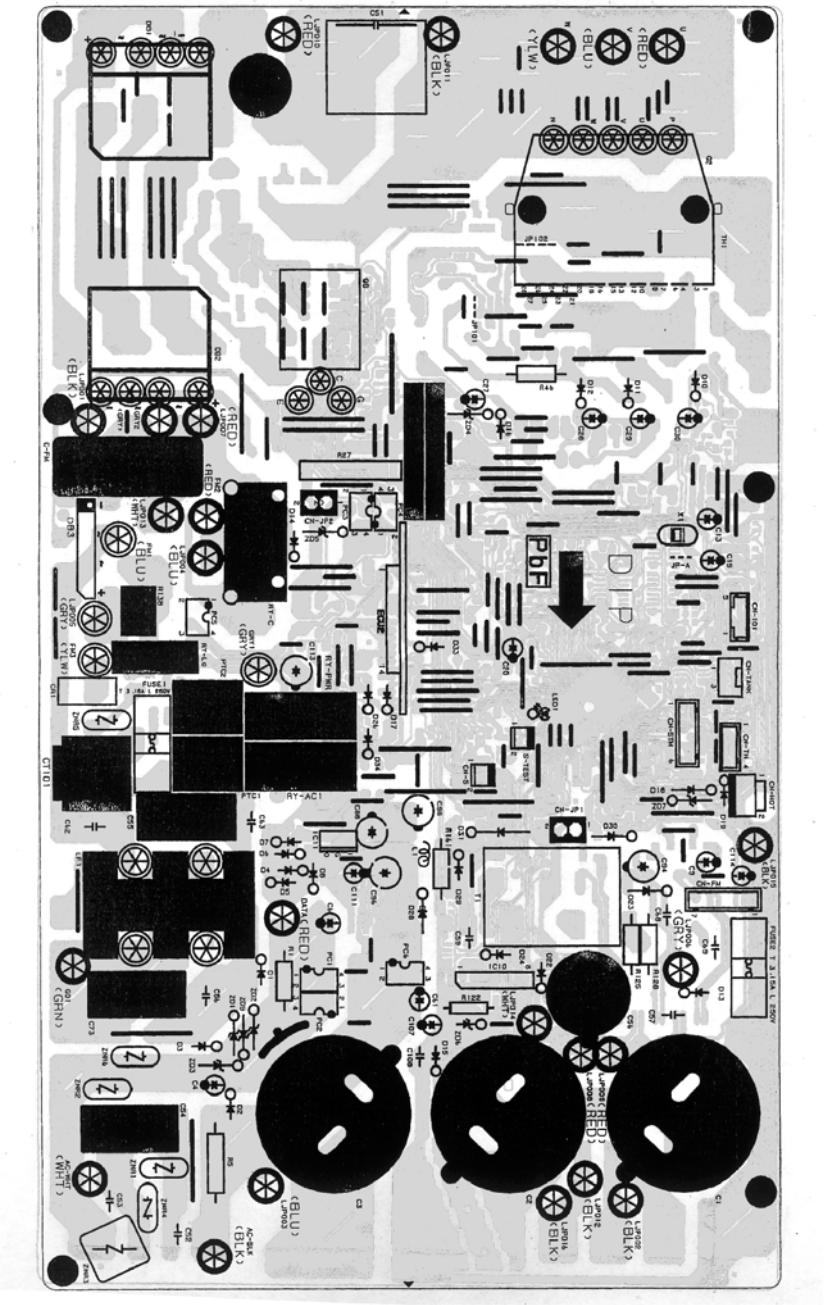


8 Printed Circuit Board

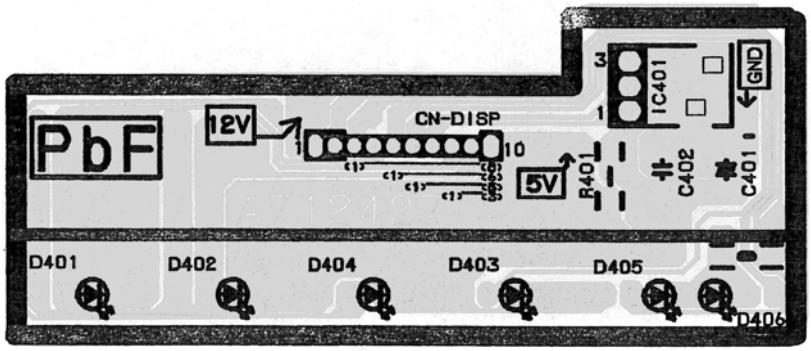
8.1. Indoor Unit (Main Printed Circuit Board)



8.2. Outdoor Unit (Main Printed Circuit Board)



8.3. Indicator panel



9 Installation Instruction

SELECT THE BEST LOCATION

INDOOR UNIT

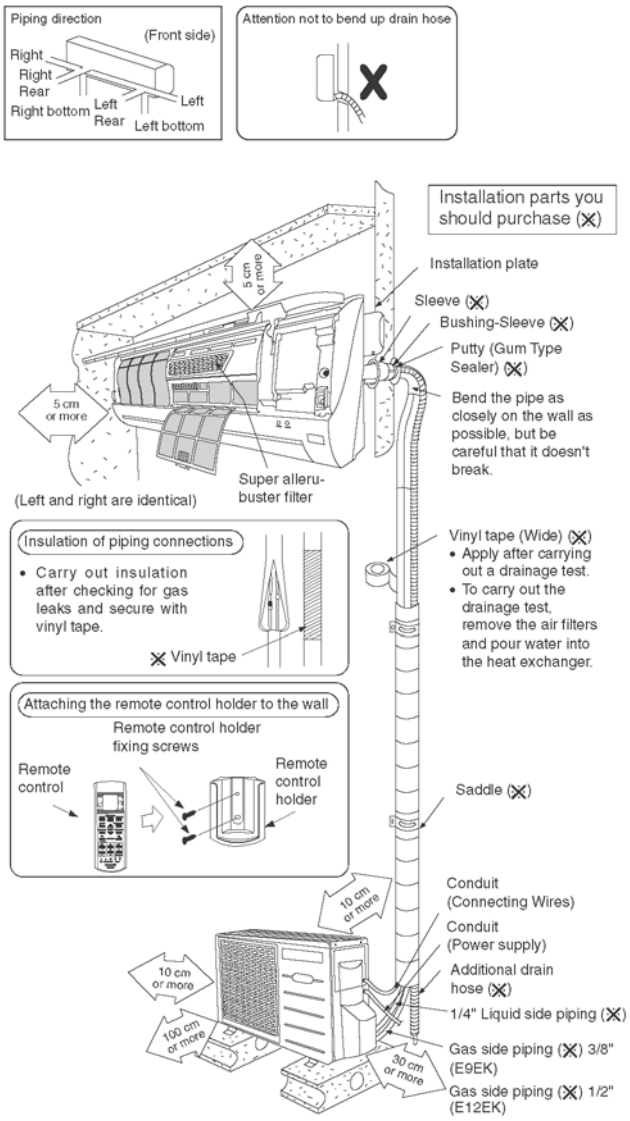
- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Recommended installation height for indoor unit shall be at least7.5 ft.

OUTDOOR UNIT

- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over 7.5m, additional refrigerant should be added as shown in the table.

Model	Piping size		Rate Length (m)	Max. Elevation (m)	Max. Piping Length (m)	Additional Refrigeration (g/m)
	Gas	Liquid				
E9EK	3/8”	1/4”	7.5	5	15	20
E12EK	1/2”	1/4”	7.5	5	15	20

Indoor/Outdoor Unit Installation Diagram

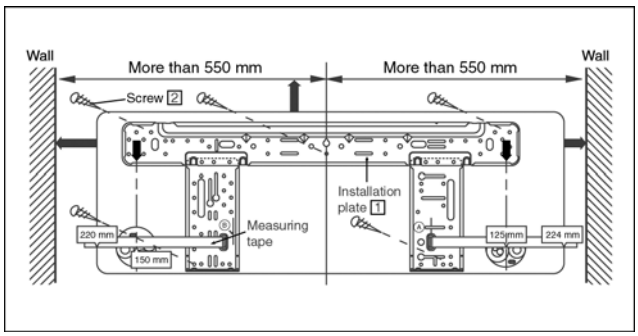

Piping direction
(Front side)
Right
Right Rear
Right bottom
Left Rear
Left
Left bottom
Attention not to bend up drain hose
Installation parts you should purchase (※)
Installation plate
Sleeve (※)
Bushing-Sleeve (※)
Putty (Gum Type Sealer) (※)
Bend the pipe as closely on the wall as possible, but be careful that it doesn't break.
5 cm or more
5 cm or more
(Left and right are identical)
Super alleru-buster filter
Insulation of piping connections
• Carry out insulation after checking for gas leaks and secure with vinyl tape.
※ Vinyl tape
Vinyl tape (Wide) (※)
• Apply after carrying out a drainage test.
• To carry out the drainage test, remove the air filters and pour water into the heat exchanger.
Attaching the remote control holder to the wall
Remote control holder fixing screws
Remote control
Remote control holder
Saddle (※)
10 cm or more
Conduit (Connecting Wires)
Conduit (Power supply)
Additional drain hose (※)
10 cm or more
100 cm or more
1/4" Liquid side piping (※)
Gas side piping (※) 3/8" (E9EK)
30 cm or more
Gas side piping (※) 1/2" (E12EK)

• This illustration is for explanation purposes only.
The indoor unit will actually face a different way.

9.1. Indoor Unit

9.1.1. HOW TO FIX INSTALLATION PLATE

The mounting wall is strong and solid enough to prevent it from the vibration.



The centre of installation plate should be at more than 550 mm at right and left of the wall.
The distance from installation plate edge to ceiling should more than 67 mm.
From installation plate left edge to unit's left side is 47 mm.
From installation plate right edge to unit's right is 73 mm.

Ⓑ : For left side piping, piping connection for liquid should be about 126 mm from this line.
: For left side piping, piping connection about 174 mm from this line.
: For left side piping, piping connection about 984 mm from this line.

1. Mount the installation plate on the wall with 5 screws or more.
   (If mounting the unit on the concrete wall, consider using anchor bolts.)
   • Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge

2. Drill the piping plate hole with ø70 mm hole-core drill.
   • Line according to the arrows marked on the lower left and right side of the installation plate. The meeting point of the extended line is the centre of the hole. Another method is by putting measuring tape at position as shown in the diagram above. The hole centre is obtained by measuring the distance namely 150 mm and 125 mm for left and right hole respectively.
   • Drill the piping hole at either the right or the left and the hole should be slightly slanted to the outdoor side.

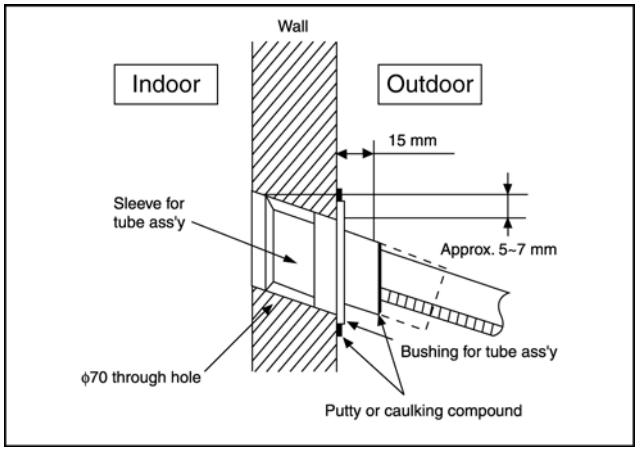
3. **For the embedded piping**

9.1.2. TO DRILL A HOLE IN THE WALL AND INSTALL A SLEEVE OF PIPING

1. Insert the piping sleeve to the hole.
2. Fix the bushing to the sleeve.
3. Cut the sleeve until it extrudes about 15 mm from the wall.

Caution
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

4. Finish by sealing the sleeve with putty or caulking compound at the final stage.



9.1.3. INDOOR UNIT INSTALLATION

1. **For the right rear piping**

Pull out the Indoor piping
↓
Install the Indoor Unit
↓
Secure the Indoor Unit
↓
Insert the connecting cable

2. **For the right and right bottom piping**

Pull out the Indoor piping
↓
Install the Indoor Unit
↓
Insert the connecting cable
↓
Secure the Indoor Unit

Replace the drain hose

⬇

Bend the embedded piping

⬇

- Use a spring bender or equivalent to bend the piping so that the piping is not crushed.

Install the Indoor Unit

⬇

Cut and flare the embedded piping

⬇

- When determining the dimensions of the piping, slide the unit all the way to the left on the installation plate.
- Refer to the section "Cutting and flaring the piping".

Pull the connecting cable into Indoor Unit

⬇

- The inside and outside connecting cable can be connected without removing the front grille.

Connect the piping

⬇

- Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)

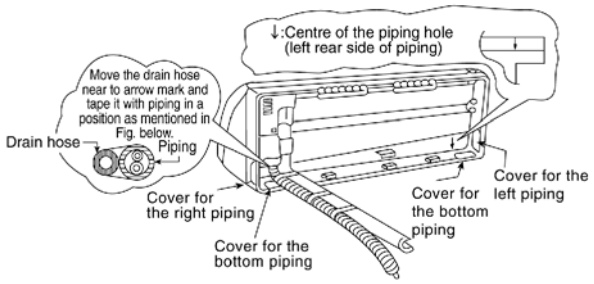
Insulate and finish the piping

⬇

- Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connections" column as mentioned in Indoor/ Outdoor Unit Installation.

Secure the Indoor Unit

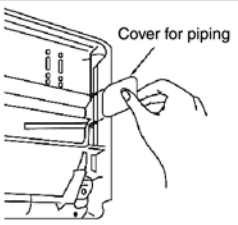
Pull out the piping and drain hose


↓:Centre of the piping hole
(left rear side of piping)
Move the drain hose near to arrow mark and tape it with piping in a position as mentioned in Fig. below.
Drain hose
Piping
Cover for the right piping
Cover for the bottom piping
Cover for the bottom piping
Cover for the left piping

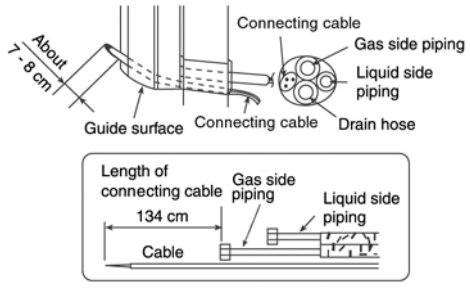
How to keep the cover

In case of the cover is cut, keep the cover at the rear of chassis as shown in the illustration for future reinstallation.

(Left, right and 2 bottom covers for piping.)

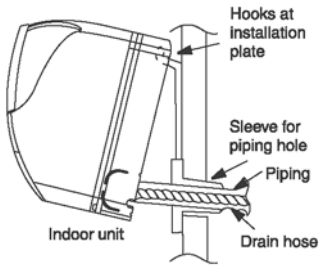


Insert the connecting cable



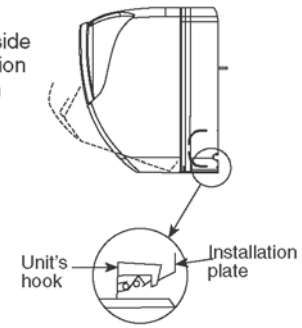
Install the Indoor Unit

Hook the indoor unit onto the upper portion of installation plate (Engage the indoor unit with the upper edge of the installation plate). Ensure the hooks are properly seated on the installation plate by moving in left and right.

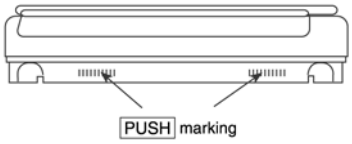


Secure the Indoor Unit

1. Press the lower left and right side of the unit against the installation plate until hooks engages with their slot (sound click).



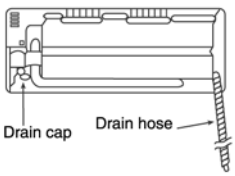
To take out the unit, push the PUSH marking at the bottom unit, and pull it slightly towards you to disengage the hooks from the unit.

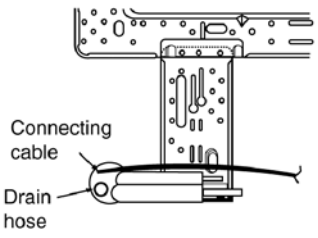


(This can be used for left rear piping and left bottom piping also.)

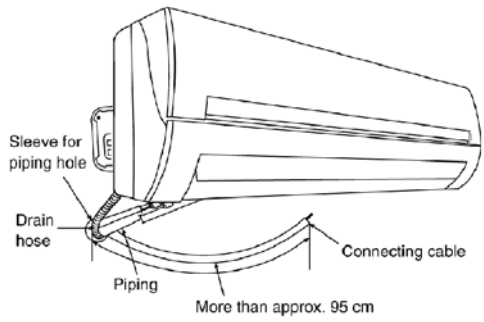
Exchange the drain hose and the cap

Rear view for left piping installation

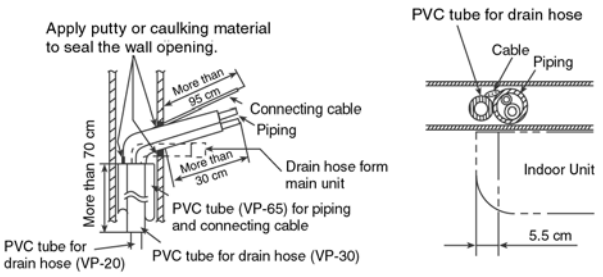




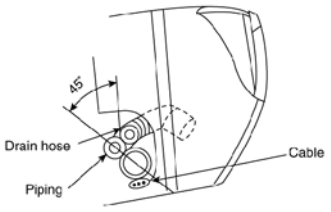
Adjust the piping slightly downwards.



• How to pull the piping and drain hose out, in case of the embedded piping.


Apply putty or caulking material to seal the wall opening.
More than 95 cm
Connecting cable
Piping
More than 70 cm
More than 30 cm
Drain hose form main unit
PVC tube (VP-65) for piping and connecting cable
PVC tube for drain hose (VP-20)
PVC tube for drain hose (VP-30)
PVC tube for drain hose
Cable
Piping
Indoor Unit
5.5 cm

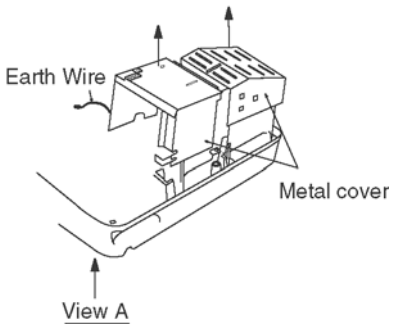
• In case of left piping how to insert the connecting cable and drain hose.



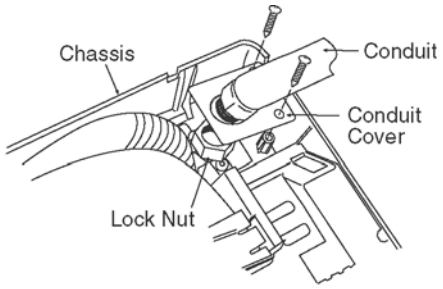
(For the right piping, follow the same procedure)

9.1.4. INDOOR UNIT ELECTRICAL WIRING

1. Remove the control board metal cover.

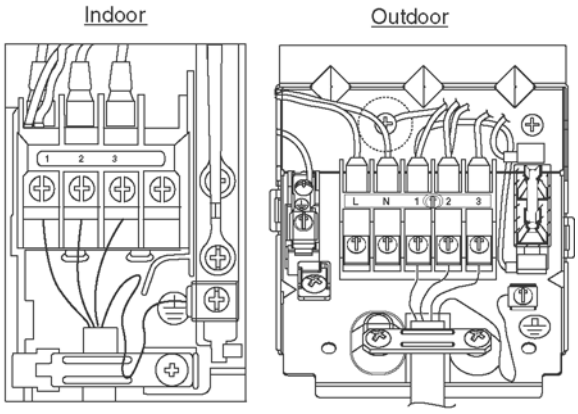


2. Unscrew the conduit cover & fix the conduit connector to conduit cover with lock nut, then secure it against chassis.



Rear Side of Indoor Unit View A

3. Connecting wire between indoor unit and outdoor unit should be UL listed or CSA approved 4 x AWG16 wire.
   - Ensure the colour of wires of outdoor unit and the terminal Nos. are the same as the indoor's respectively.
   - Earth lead wire should be longer than the other lead wires as shown in the figure for the electrical safety in case the cord slips out from the anchorage.



Terminals on the indoor unit	1	2	3
Colour of wires			
Terminals on the outdoor unit	1	2	3

   - Secure the wire onto the control board with the holder (clamper).

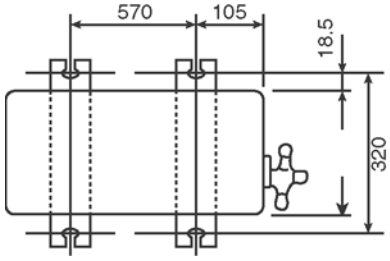
4. After completing wiring connections, reattach the metal cover to the original location.

9.2. Outdoor Unit

9.2.1. INSTALL THE OUTDOOR UNIT

- After selecting the best location, start installation according to Indoor/Outdoor Unit Installation Diagram.

1. Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut (ø10 mm).
2. When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.



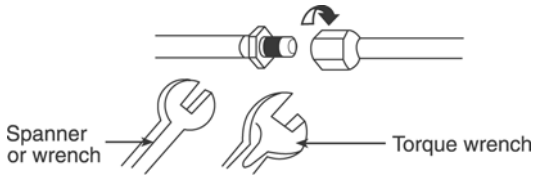
9.2.2. CONNECTING THE PIPING

Connecting The Piping To Indoor Unit

Please make flare after inserting flare nut (locate at joint portion of tube assembly) onto the copper pipe.
(In case of using long piping)

Connect the piping

- Align the center of piping and sufficiently tighten the flare nut with fingers.
- Further tighten the flare nut with torque wrench in specified torque as stated in the table.



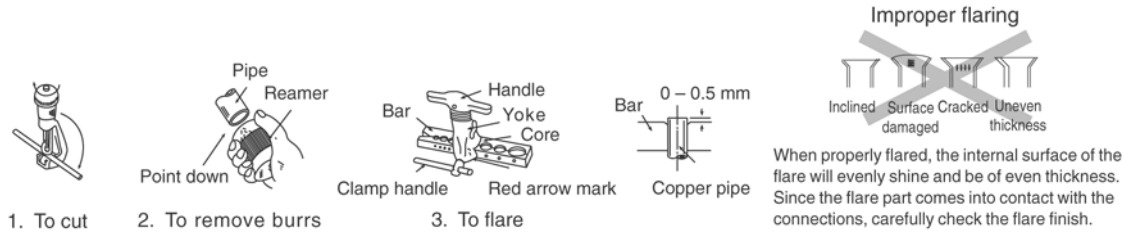
MODEL	Piping size (Torque)	
	Gas	Liquid
E9EK	3/8" (42 N•m)	1/4" (18 N•m)
C12EK	1/2" (55 N•m)	1/4" (18 N•m)

Connect The Piping to Outdoor Unit

Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (located at valve) onto the copper pipe.
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

Cutting and Flaring the Piping

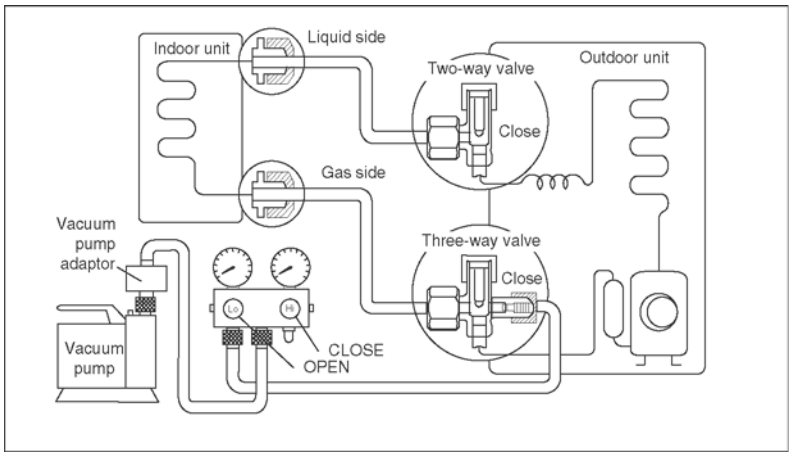
1. Please cut using pipe cutter and then remove the burrs.
2. Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
3. Please make flare after inserting the flare nut onto the copper pipes.



9.2.3. EVACUATION OF THE EQUIPMENT

1) Checking a gas leakage

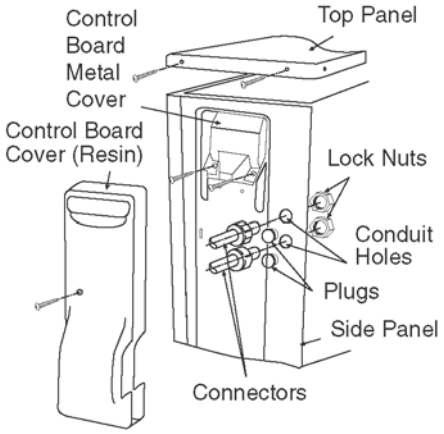
WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.



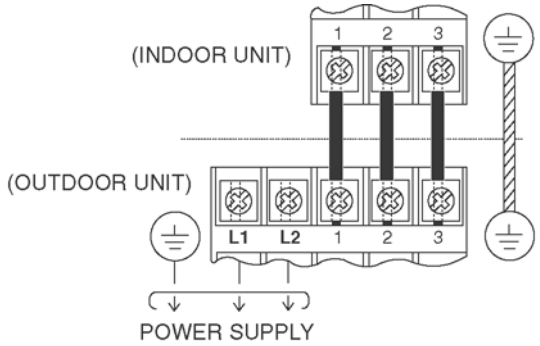
1. Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
   • Be sure to connect the end of the charging hose with the push pin to the service port.
2. Connect the center hose of the charging set to a vacuum pump with check valve, or vacuum pump and vacuum pump adaptor.
3. Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 cmHg (0 Mpa) to -76 cmHg (-0.1 MPa). Then evacuate the air approximately ten minutes.
4. Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
   Note : BE SURE TO FOLLOW THIS PROCEDURE IN ORDER TO AVOID REFRIGERANT GAS LEAKAGE.
5. Disconnect the charging hose from the vacuum pump and from the service port of the 3- way valve.
6. Tighten the service port caps of the 3-way valve at a torque of 18 N•m with a torque wrench.
7. Remove the valve caps of both of the 2-way valve and 3-way valve. Position both of the valves to “OPEN” using a hexagonal wrench (4 mm).
8. Mount valve caps onto the 2-way valve and the 3-way valve.
   • Be sure to check for gas leakage.

Caution
- If gauge needle does not move from 0 cmHg (0 Mpa) to - 76 cmHg (-0.1 MPa), in step 3 above take the following measure:
- If the leak stops when the piping connections are tightened further, continue working from step 3.
- If the leak does not stop when the connections are retightened, repair the location of leak.
- Do not release refrigerant during piping work for installation and reinstallation. Take care of the liquid refrigerant, it may cause frostbite.

9.2.4. OUTDOOR UNIT ELECTRICAL WIRING



1. Remove Top panel.
2. Remove Control Board Cover (Metal and Resin).
3. Remove Plugs.
4. Fix the conduit connectors to the conduit holes with lock-nuts, then secure them against the side panel.
5. Connecting wire between indoor unit and outdoor unit should be UL listed or CSA approved 4 x AWG16 wire.
6. Secure the wire onto the control board with the holder (clamper).
7. Cable connection to the power supply (208/230V 60Hz) through circuit breaker.
   • Connect the UL listed or CSA approved power wires (AWG14) heavier cord to the terminal board, and connect the other end of the wires to circuit breaker.
8. After completing wiring connections, reattach the control board cover (Metal and Resin) and the top panel to the original position with the screws.



Note: Secure the wires onto the control board with the holder (clamper).

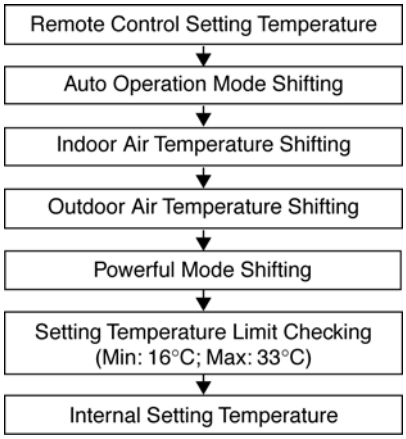
10 Operation and Control

10.1. Basic Function

Inverter control, which equipped with a microcomputer in determining the most suitable operating mode as time passes, automatically adjusts output power for maximum comfort always. In order to achieve the suitable operating mode, the microcomputer maintains the set temperature by measuring the temperature of the environment and performing temperature shifting. The compressor at outdoor unit is operating following the frequency instructed by the microcomputer at indoor unit that judging the condition according to internal setting temperature and intake air temperature.

10.1.1. Internal Setting Temperature

Once the operation starts, remote control setting temperature will be taken as base value for temperature shifting processes. These shifting processes are depending on the air conditioner settings and the operation environment. The final shifted value will be used as internal setting temperature and it is updated continuously whenever the electrical power is supplied to the unit.



10.1.2. Airflow Direction

1. There are two types of airflow, vertical airflow (directed by horizontal vane) and horizontal airflow (directed by vertical vanes).
2. Control of airflow direction can be automatic (angles of direction is determined by operation mode, heat exchanger temperature and intake air temperature) and manual (angles of direction can be adjusted using remote control).

10.1.2.1. Vertical Airflow

Operation Mode	Airflow Direction			Vane Angle (°)				
				1	2	3	4	5
Heating	Auto with Heat Exchanger Temperature	A	Upward fix	3				
		B	Downward fix	64				
		C	Upward fix	3				
		D	Downward fix	3				
	Manual	A	Upward fix	3	17	33	49	63
Cooling, Soft Dry	Auto			8 ~ 36				
	Manual			8	15	22	30	36
Mode Judgement in Auto	Auto			8				
	Manual			8	15	22	30	36

1. Automatic vertical airflow direction can be set using remote control; the vane swings up and down within the angles as stated above. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below. When the air conditioner is stopped using remote control, the vane will shift to close position.

2. Manual vertical airflow direction can be set using remote control; the angles of the vane are as stated above and the positions of the vane are as Figure 2 below. When the air conditioner is stopped using remote control, the vane will shift to close position.

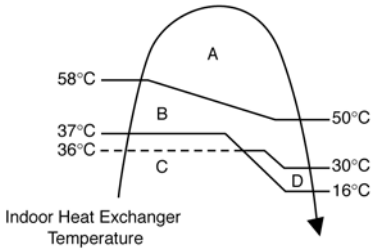


Figure 1

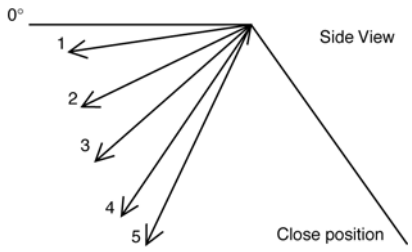


Figure 2

10.1.2.2. Horizontal Airflow

1. Automatic horizontal airflow direction can be set using remote control; the vane swings left and right within the angles as stated below. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below.

Operation Mode		Vane Angle (°)
Heating, with heat exchanger temperature	A	65 ~ 115
	B	90
Cooling, Soft Dry		65 ~ 115

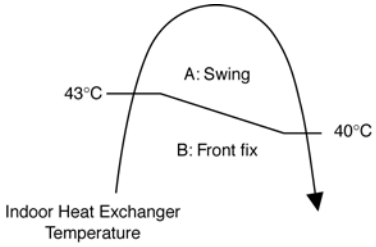


Figure 1

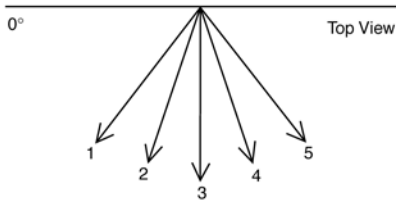


Figure 2

2. Manual horizontal airflow direction can be set using remote control; the angles of the vane are as stated below and the positions of the vane are as Figure 2 above.

Pattern	1	2	3	4	5
Airflow Direction Patterns at Remote Control					
Vane Angle (°)	90	65	78	102	115

10.1.3. Quiet operation (Cooling Mode/Cooling area of Soft Dry Mode)

A. Purpose

To provide quiet cooling operation compare to normal operation.

B. Control condition

a. Quiet operation start condition

- When “quiet” button at remote control is pressed.
  Quiet LED illuminates.

b. Quiet operation stop condition

1. When one of the following conditions is satisfied, quiet operation stops:
   a. Powerful button is pressed.
   b. Stop by OFF/ON switch.
   c. Timer “off” activates.
   d. Quiet button is pressed again.

2. When quiet operation is stopped, operation is shifted to normal operation with previous setting.
3. When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.

4. When operation mode is changed, quiet operation is shifted to quiet operation of the new mod
5. During quiet operation, if timer “on” activates, quiet operation maintains.
6. After off, when on back, quiet operation is not memorised.

C. Control contents

1. Fan speed is changed from normal setting to quiet setting of respective fan speed.
   This is to reduce sound of Hi, Me, Lo for 3dB.
2. Fan speed for quiet operation is -1 step from setting fan speed.

10.1.3.1. Quiet operation (Heating)

A. Purpose

To provide quiet heating operation compare to normal operation.

B. Control condition

a. Quiet operation start condition

- When “quiet” button at remote control is pressed.
  Quiet LED illuminates.

b. Quiet operation stop condition

1. When one of the following conditions is satisfied, quiet operation stops:
   a. Powerful button is pressed.
   b. Stop by OFF/ON switch.
   c. Timer “off” activates.
   d. Quiet button is pressed again.

2. When quiet operation is stopped, operation is shifted to normal operation with previous setting.
3. When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.
4. When operation mode is changed, quiet operation is shifted to quiet operation of the new mod
5. During quiet operation, if timer “on” activates, quiet operation maintains.
6. After off, when on back, quiet operation is not memorised.

C. Control contents

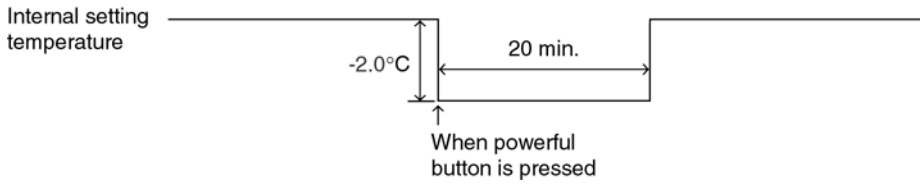
a. Fan Speed manual

1. Fan speed is changed from normal setting to quiet setting of respective fan speed.
   This is to reduce sound of Hi, Me, Lo for 3dB.
2. Fan speed for quiet operation is -1 step from setting fan speed.
3. Fan Speed Auto
   Indoor FM RPM depends on pipe temp sensor of indoor heat exchanger.

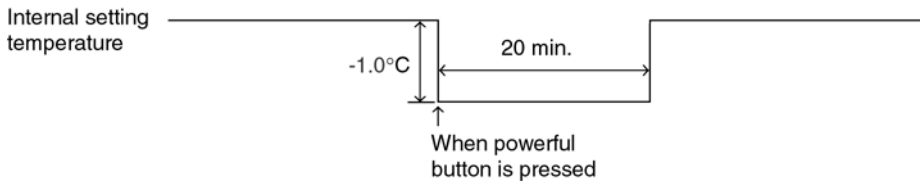
10.1.4. Powerful Mode Operation

When the powerful mode is selected, the internal setting temperature will shift to achieve the setting temperature quickly.

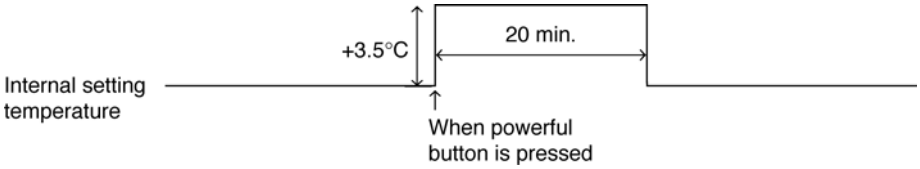
(a) Cooling Operation



(b) Soft Dry Operation



(b) Heating Operation

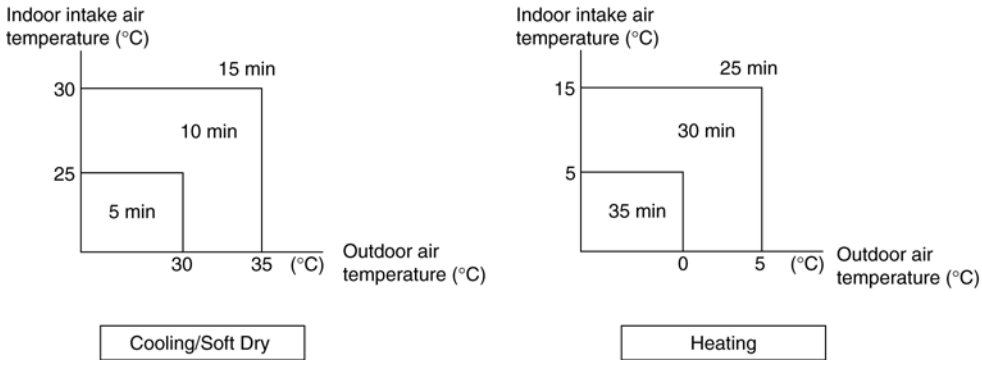


10.1.5. ON Timer Control

ON timer can be set using remote control, the unit with timer set will start operate earlier than the setting time. This is to provide a comfortable environment when reaching the set ON time.

60 minutes before the set time, indoor (at fan speed of Lo-) and outdoor fan motor start operate for 30 seconds to determine the indoor intake air temperature and outdoor air temperature in order to judge the operation starting time.

From the above judgment, the decided operation will start operate earlier than the set time as shown below.



10.1.6. OFF Timer Control

OFF timer can be set using remote control, the unit with timer set will stop operate at set time.

10.2. Protection Control

10.2.1. Time Delay Safety Control

- Compressor will not start for three minutes after stop of the operation.

10.2.2. 30 Seconds Forced Operation

- Once compressor starts the operation, it will not stop its operation for 30 seconds. However, it can be stopped with the remotecontroller or the Auto button on the indoor unit.

10.2.3. Total Running Current Control

1. When the outdoor unit total running current (AC) exceeds X value, the frequency instructed for compressor operation will be decreased.

2. If the running current does not exceed X value for five seconds, the frequency instructed will be increased.

3. However, if total outdoor unit running current exceeds Y value, compressor will be stopped immediately for 3 minutes.

Model	E9EK		E12EK	
Operation Mode	X (A)	Y (A)	X (A)	Y (A)
Cooling/Soft Dry (A)	4.0	16.8	5.4	16.8
Cooling/Soft Dry (B)	3.6	16.8	5.0	16.8
Heating	5.5	16.8	8.4	16.8

10.2.4. IPM (Power transistor) Prevention Control

A. Overheating Prevention Control

1. When the IPM temperature rises to 100°C, compressor operation will stop immediately.
2. Compressor operation restarts after three minutes the temperature decreases to 95°C.

B. DC Peak Current Control

1. When electric current to IPM exceeds set value of 18.5 A, the compressor will stop operate. Then, operation will restart afterthree minutes.
2. If the set value is exceeded again more than 30 seconds after the compressor starts, the operation will restart after two minute.
3. If the set value is exceeded again within 30 seconds after the compressor starts, the operation will restart after one minute. If this condition repeats continuously for seven times, all indoor and outdoor relays will be cut off.

10.2.5. Compressor Overheating Prevention Control

1. If discharge pipe temperature exceeds 100°C, compressor power will be limited.
2. If discharge pipe temperature exceeds 112°C, compressor will be stopped.
3. If the above excess occurs 4 times per 10 minutes, timer LED will be blinking. (“F97” is to be confirmed.)

10.2.6. Outdoor High Pressure Prevention Control (Cooling and Soft Dry Operations)

1. If outdoor heat exchanger temperature exceeds 63°C in cooling or soft dry operation, compressor will be stopped.
2. Timer LED is not blinking. (“F95” is memorized, then.)

10.2.7. Low Pressure Prevention Control (Gas Leakage Detection)

a. Control start conditions

Control will perform when (1) - (3) condition continues operation for 5 minute and (4) is fulfill.

1. During cooling and dry operation: Frequency more than normal Fcmax.
   During heating operation: Frequency more than normal Fh
2. Outdoor total current I cooling: Ib I Ia
   Heating: Ib I Ic
   Ic = Ia = 1.65 A
   Ib = 0.65 A
3. It is not during deice operation.
4. During cooling and dry operation: indoor suction-indoor piping temperature is below 4°C.
   During of heating operation: Indoor piping temperature-indoor suction is under 5°C.
   Control contents:
   • compressor stops (restart after 3 minutes)
   • if happen 2 times within (20 minutes), perform the following operatio
     1) Unit stop operation
     1) Timer LED blink and “F91” indicated

10.2.8. Compressor Tank Temperature Rise Protection Control

a. Control start conditions

Control will perform when (1) - (3) condition continues operation for 5 minute and (4) is fulfill.

1. During cooling and dry operation: Frequency more than normal Fc.
   Air-temperature: Indoor and outdoor 30±5 degrees C
   Remote control Hi; 16 degrees C
   During Heating operation: Frequency more than Fh
   Air-temperature: Indoor and outdoor 20±2 degrees C
   Remote control Hi; 30 degrees C
2. Outdoor total current I Air conditioning: 0.65<=I<1.65.
   It is not during deice operation.
3. During cooling and dry operation: indoor suction-indoor piping temperature is below 4°C.
   During heating operation: Indoor piping temperature-indoor suction is under 5°C.
   Control contents:
   • compressor stops (restart after 3 minutes)
   • if happen 2 times within (20 minutes), perform the following operatio
     1) Unit stop operation
     1) Timer LED blink and “F91” indicated

10.2.9. Four-way Valve Operation Detection Control (Switching Abnormality between Cooling and Heating)

In Cooling operation

1. When indoor heat exchanger temperature exceeds 45°C in 4 minutes after compressor starts, compressor will be stopped.
2. If the above excess occurs 4 times per 30 minutes, timer LED is to be blinking. (“F11” is to be confirmed.)

In Heating operation

1. When indoor heat exchanger temperature is below 0°C in 4 minutes after compressor starts, compressor will be stopped.
2. If the above excess occurs 4 times per 30 minutes, timer LED is to be blinking. (“F11” is to be confirmed.)

10.2.10. Freeze Prevention Control (Cooling and Soft Dry Operation)

Limit of Cooling power

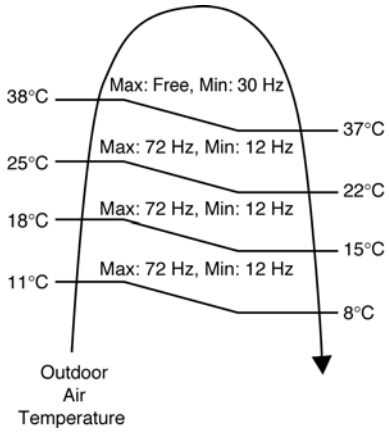
1. When temperature of indoor heat exchanger is below 5°C, operating frequency will be decreased.
2. When temperature of indoor heat exchanger exceeds 7°C, operating frequency will be increased. (But, up to programmed frequency.)
3. When temperature of indoor heat exchanger is below 0°C continuously for 6 minutes, compressor will be stopped.
4. Timer LED is not blinking. (“F99” is memorized, then.)

Limit of Indoor fan speed

- When temperature of indoor heat exchanger is below 6°C (2°C at Soft Dry) continuously for 6 minutes, indoor fan speed will be increased by 50 rpm.

10.2.11. Outdoor Air Temperature Control

The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below. This control will begin one minute after the compressor starts.



10.2.12. Indoor Intake Air Temperature Control (Heating operation)

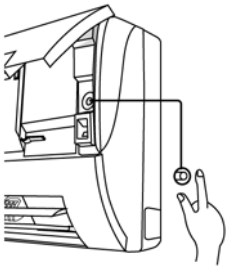
1. When indoor air temperature is 35°C or more, the maximum power will be limited up to the rated power.
2. When fan speed is set at “Lo” and intake air temperature is below 21°C, the maximum power will be limited up to the rated-power.

11 Servicing Mode

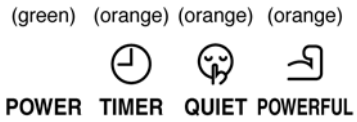
11.1. Auto Switch Operation

The below operations will be performed by pressing the “AUTO” switch.

1. AUTO OPERATION MODE
   The Auto operation will be activated immediately once the Auto Switch is pressed.
2. TEST RUN OPERATION (FOR PUMP DOWN/SERVICING PURPOSE)
   The Test Run operation will be activated if the Auto Switch is pressed continuously for more than 5 sec. A “beep” sound will occur at the fifth sec., in order to identify the starting of Test Run operation.
3. REMOTE CONTROLLER RECEIVING SOUND ON/OFF
   The ON/OFF of remote controller receiving sound can be change over by pressing the following step:
   a. Release the Auto Switch after Test Run operation is activated.
   b. Then, within 20 sec., after a., press Auto Switch for more than 5 sec.
      A “beep” “beep” sound will occur at the fifth sec., then release the Auto Switch.
   c. Within 20 sec. after b., press Auto Switch again. Everytime Auto Switch is pressed (within 20 sec. interval), remote controller receiving sound status will be reversed between ON and OFF.
      Long “beep” sound indicates that remote controller receiving sound is OFF.
      Short “beep” sound indicates that remote controller receiving sound is ON.



11.2. Indicator Panel



LED	POWER	TIMER	QUIET	POWERFUL
Color	Green	Orange	Orange	Orange
Light ON	Operation ON	Timer Setting ON	Quiet Mode ON	Powerful Mode ON
Light OFF	Operation OFF	Timer Setting OFF	Quiet Mode OFF	Powerful Mode OFF

Note:

- If POWER LED is blinking, the possible operations of the unit are Hot Start, during Deice operation, operation mode judgment, or ON timer sampling.
- If Timer LED is blinking, there is an abnormality operation occurs.

12 Troubleshooting Guide

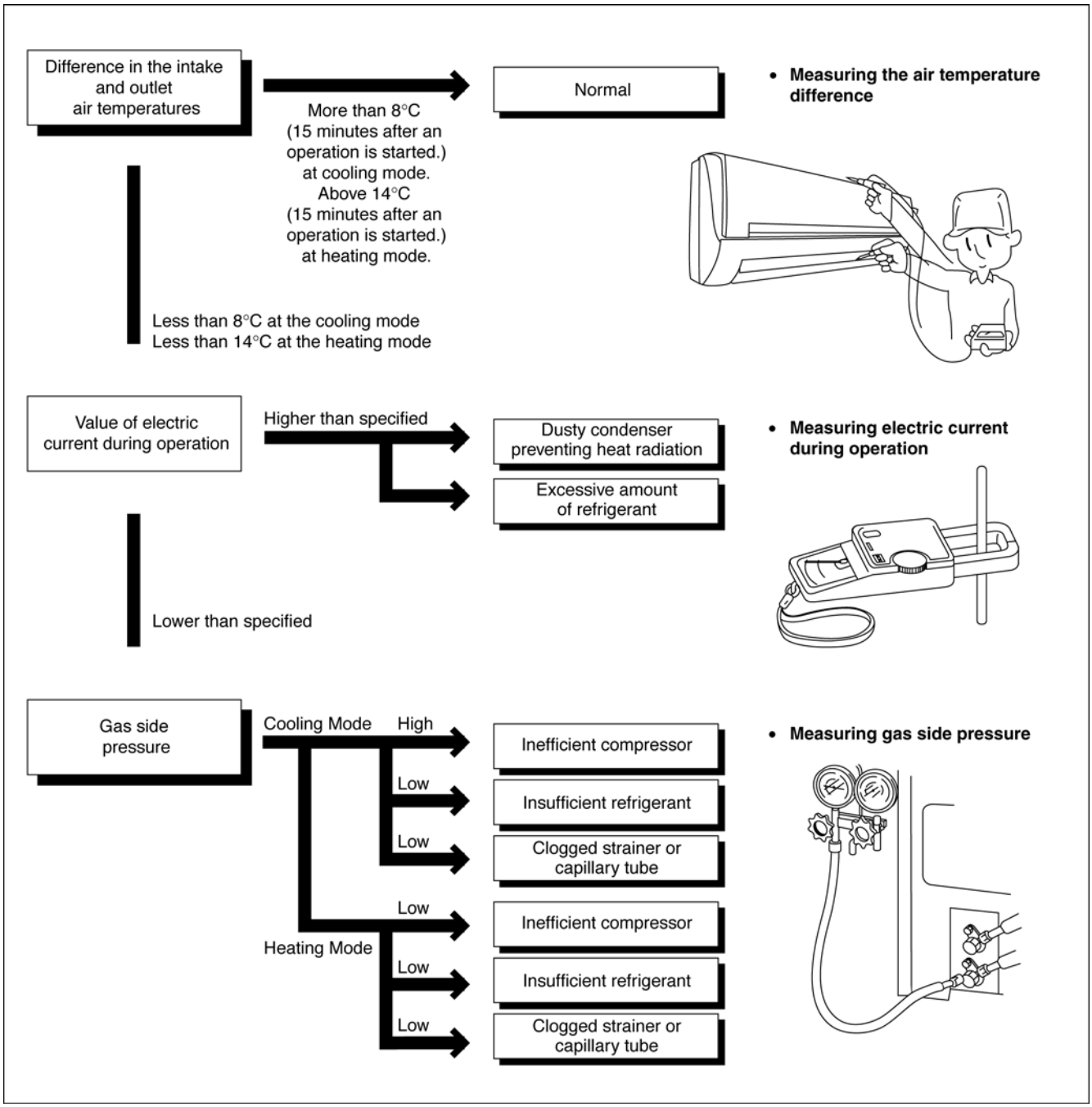
12.1. Refrigeration Cycle System

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure MPa (kg/cm²G)	Outlet air temperature (°C)
Cooling Mode	0.9 ~ 1.2 (9 ~ 12)	12 ~ 16
Heating Mode	2.3 ~ 2.9 (23 ~ 29)	36 ~ 45

★ Condition:
- Indoor fan speed; High
- Outdoor temperature 35°C at cooling mode and 7°C at heating mode.
- Compressor operates at rated frequency


Difference in the intake and outlet air temperatures
More than 8°C (15 minutes after an operation is started.) at cooling mode.
Above 14°C (15 minutes after an operation is started.) at heating mode.
Normal
Less than 8°C at the cooling mode
Less than 14°C at the heating mode
• Measuring the air temperature difference
Value of electric current during operation
Higher than specified
Dusty condenser preventing heat radiation
Excessive amount of refrigerant
Lower than specified
• Measuring electric current during operation
Gas side pressure
Cooling Mode
High
Low
Low
Inefficient compressor
Insufficient refrigerant
Clogged strainer or capillary tube
Heating Mode
Low
Low
Low
Inefficient compressor
Insufficient refrigerant
Clogged strainer or capillary tube
• Measuring gas side pressure

12.1.1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operating	Low Pressure	High Pressure	Electric current during operating
Insufficient refrigerant (gas leakage)	↘	↘	↘	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘	↘	↘	↘
Short circuit in the indoor unit	↘	↘	↘	↗	↗	↗
Heat radiation deficiency of the outdoor unit	↗	↗	↗	↘	↘	↘
Inefficient compression	↗	↘	↘	↗	↘	↘

• Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

12.1.2. Breakdown Self Diagnosis Function

12.1.2.1. Self Diagnosis Function (Three Digits Alphanumeric Code)

- Once abnormality has occurred during operation, the unit will stop its operation, and Timer LED blinks.
- Although Timer LED goes off when power supply is turned off, if the unit is operated under a breakdown condition, the LED will light up again.
- In operation after breakdown repair, the Timer LED will no more blink. The last error code (abnormality) will be stored in IC memory.
- **To make a diagnosis**
  1. Timer LED start to blink and the unit automatically stops the operation.
  2. Press the CHECK button on the remote controller contiuously for 5 seconds.
  3. "- - " will be displayed on the remote controller display. Note: Display only for "- -". (No transmitting signal, no receiving sound and no Power LED blinking.)
  4. Press the "TEMP" v or V button on the remote controller. The code "H00" (no abnormality) will be displayed and signal will be transmitted to the main unit.
  5. Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.
  6. When the latest abnormality code on the main unit andcode transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.
  7. The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
  8. The LED will be off if the unit is turned off or the AC RESET button on the main unit is pressed.
- **To display memorized error (Protective operation)**
  1. Turn power on.
  2. Press the CHECK button on the remote controller contiuously for 5 seconds.
  3. "- - " will be displayed on the remote controller display. Note: Display only for "- -". (No transmitting signal, no receiving sound and no Power LED blinking.)
  4. Press the "TEMP" or button on the remote controller. Thecode "H00" (no abnormality) will be displayed and signalwill be transmitted to the main unit. The power LED lights up. If no abnormality is stored in the memory, three beeps sound will be heard.
  5. Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.
  6. When the latest abnormality code on the main unit andcode transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.
  7. The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
  8. The same diagnosis can be repeated by turning power on again.

- **To clear memorized error (Protective operation) status after repair**
  1. Turn power on.
  2. Press the AUTO button for 5 seconds (A beep receiving sound) on the main unit to operate the unit at Forced Cooling Operation modes.
  3. Press the CHECK button on the remote controller.
- **Temporary Operation (Depending on breakdown status)**
  1. Press the AUTO button (A beep receiving sound) on the-main unit to operate the unit. (Remote control will become possible.)
  2. The unit can temporarily be used until repaired.

Error Code	Operation	Temporary items
H23	Cooling	Emergency Operation with limited power
H27, H28	Cooling, Heating	

12.1.3. Error Codes Table

Diagnosis display	Abnormality / Protection control	Abnormality Judgement	Emergency operation	Primary location to verify
H11	Indoor / outdoor abnormal communication	> 1 min after starting operation	Indoor fan operation only	• Internal / external cable connections • Indoor / Outdoor PCB
H12	Connection capability rank abnormal	—	—	—
H14	Indoor intake air temperature sensor abnormality	Continue for 5 sec.	—	• Intake air temperature sensor (detective or disconnected)
H15	Outdoor compressor temperatur sensor abnormality	Continue for 5 sec.	—	• Compressor temperature sensor (detective or disconnected)
H16	Outdoor Current Transformer open circuit	—	—	• Outdoor PCB • IPM (Power transistor) module
H19	Indoor fan motor merchanism lock	—	—	• Indoor PCB • Fan motor
H23	Indoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	O (Cooling only)	• Heat exchanger temperature sensor (defective or disconnected)
H27	Outdoor air temperature sensor abnormality	Continue for 5 sec.	O	• Outdoor temperature sensor (defective or disconnected)
H28	Outdoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	O	• Outdoor heat exchanger temperature sensor (defective or disconnected)
H33	Indoor/Outdoor wrong connection	—	—	• Indoor/Outdoor supply voltage
H38	Indoor/outdoor mismatch (brand code)	—	—	—
H98	Indoor high pressure protection	—	—	• Air filter dirty • Air circulation short circuit
H99	Indoor heat exchanger anti-freezing protection	—	—	• Insufficient refrigerant • Air filter dirty
F11	Cooling / Heating cycle changeover abnormality	4 times occurance within 30 minutes	—	• 4-way valve • V-coil
F90	PFC control	4 times occurance within 10 minutes	—	• Voltage at PFC
F91	Refrigeration cycle abnormal	2 times occurance within 20 minutes	—	• No refrigerant (3-way valve is closed)
F93	Compressor rotation failure	—	—	• Compressor
F95	Cool high pressure protection	4 times occurance within 20 minutes	—	• Outdoor refrigerant circuit
F96	IPM (power transistor) overheating protection	—	—	• Excess refrigerant • Improper heat radiation • IPM (Power transistor)
F97	Outdoor compressor overheating protection	4 times occurance within 10 minutes	—	• Insufficient refrigerant • Compressor
F98	Total running current protection	3 times occurance within 20 minutes	—	• Excess refrigerant • Compressor
F99	Outdoor Direct Current (DC) peak detection	7 times occurance continuously	—	• Outdoor PCB • IPM (Power transistor) • Compressor

Note:
“O” - Frequency measured and fan speed fixed.

The memory data of error code is erased when the power supply is cut off, or press the Auto Switch until “beep” sound heard following by pressing the “RESET” button at remote controller.
Although operation forced to stop when abnormality detected, emergency operation is possible for certain errors (refer to Error Codes Table) by using remote controller or Auto Switch at indoor unit. However, the remote controller signal receiving sound is changed from one “beep” to four “beep” sounds.

13 Disassembly and Assembly Instructions

13.1. Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures

13.1.1. To remove the Front Grille

- Lift to open the vertical vent gently. (Fig. 1)
- Remove 2 caps and 2 screws at the bottomof discharge vent. (Fig. 1)
- Hold both sides of the frontgrille and remove it by pullingup and towards you gently. (Fig. 1)

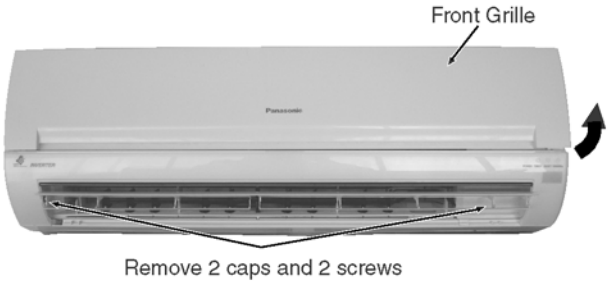


Fig. 1

- Remove the earth wire. (Fig. 2)
- Remove the control board cover complete screw. (Fig. 2)
- Remove the control board complete. (Fig. 2)

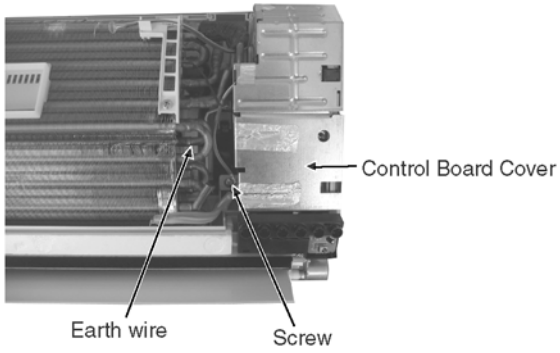


Fig. 2

13.1.2. To remove the Main Electronic Controller

- Remove the control board cover. (Fig. 3)
- Remove the screw holding the indicator. (Fig. 3)

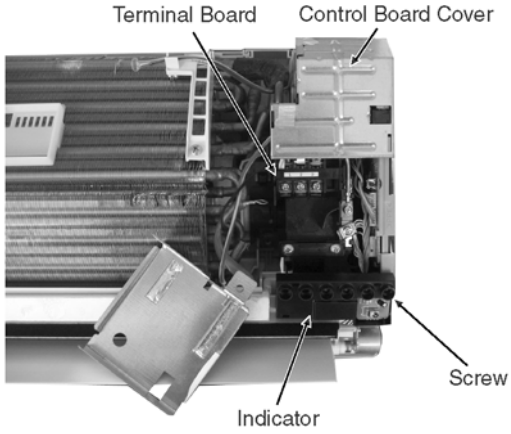


Fig. 3

- Press the fastener to the right and take out the particular piece. Pull out the main electronic controller half way. (Fig. 4)
- Remove the red wire from the terminal board. (Fig. 4)
- Remove the connector from the indicator. (Fig. 4)
- Remove 2 screws (earth wire). (Fig. 4)

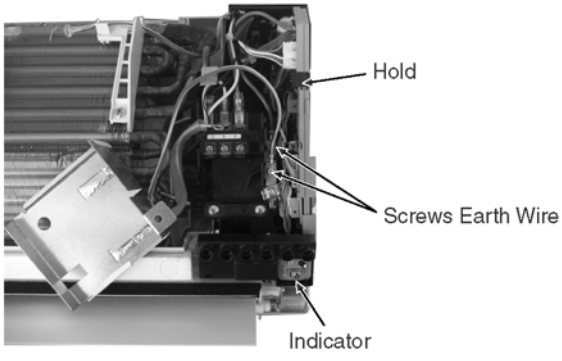


Fig. 4

• Detach 5 connectors as labeled from the electronic controller. Then, pull it out slowly while pressing the fastener to the right. (Fig. 5)

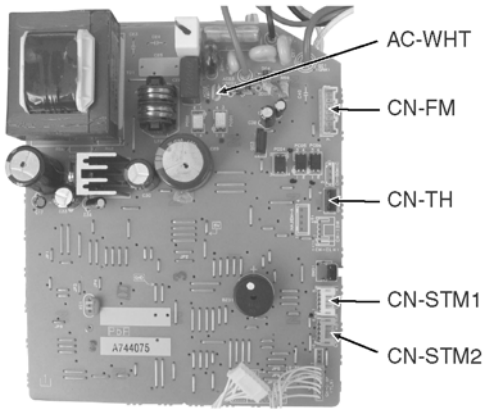


Fig. 5

13.1.3. To remove the Discharge Grille

• Remove the drain hose from the discharge grille. (Fig. 6)
• Remove the screw holding the discharge grille. (Fig. 6)
• Then pull the discharge grille downward gently to dismantle it. (Fig. 6)
• Remove 3 screws holding the control board. Press down the control board fastener and the whole control board can be removed. (Fig. 6)

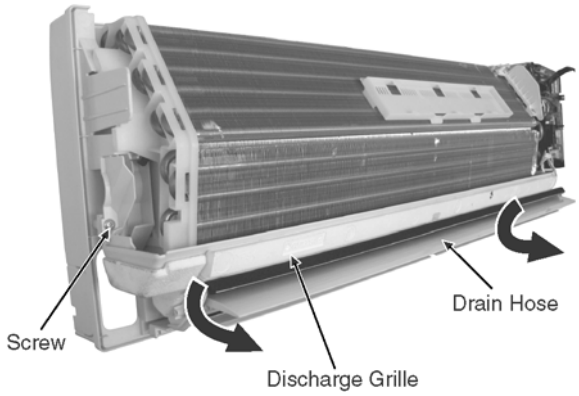


Fig. 6

13.1.4. To remove the Cross Flow Fan and Indoor Fan Motor

• Remove the bearing by pulling it out gently. (Fig. 7)

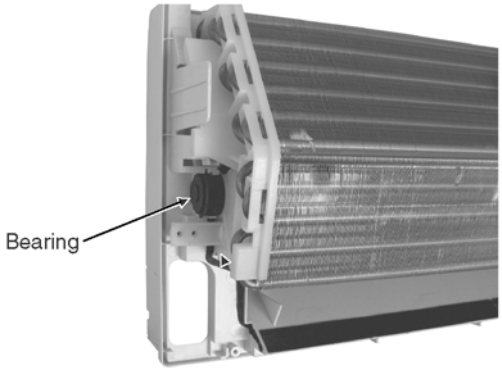


Fig. 7

• Push the hook to the left and lift up the evaporator.
• Then, remove cross flow fan by pulling both cross flow fan and fan motor.

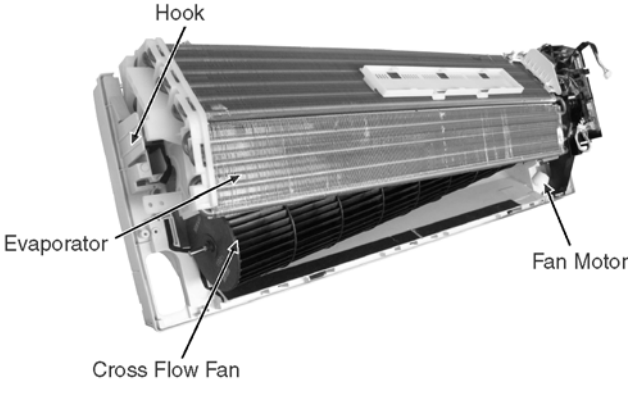


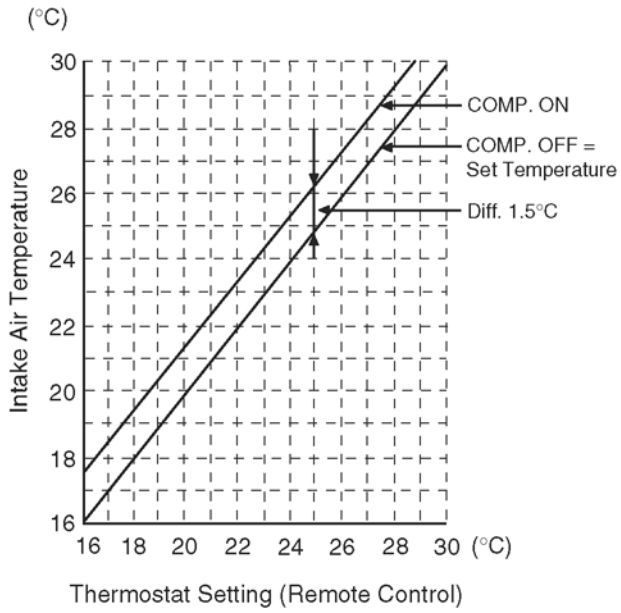
Fig. 8

14 Technical Data

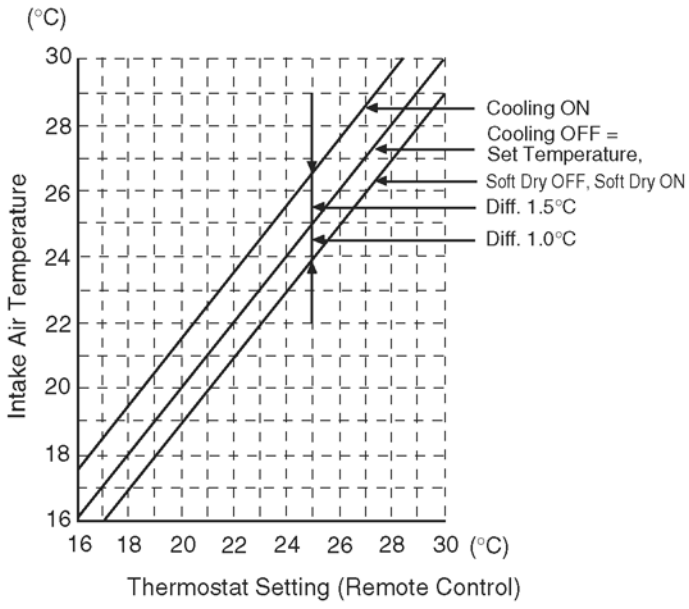
14.1. Thermostat Characteristics

CS-E9EKK CS-E12EKK

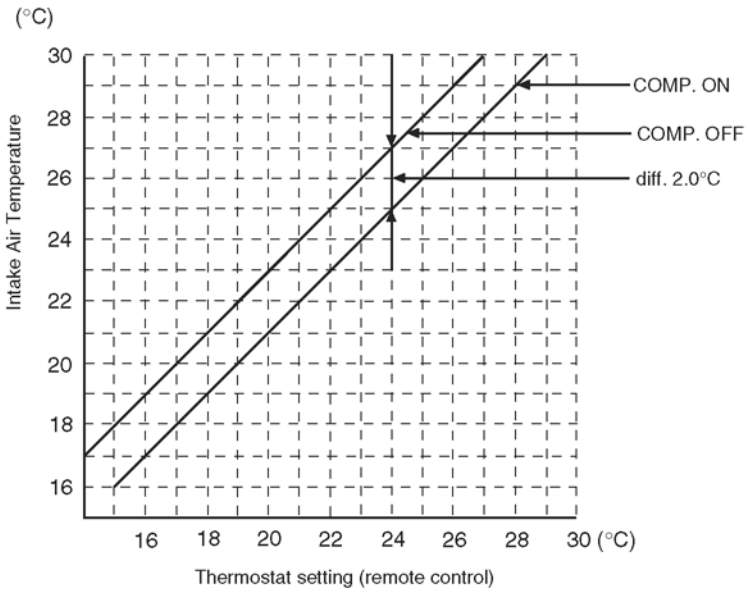
- **Cooling**



- **Soft Dry**



- **Heating**



14.2. Operation Characteristics

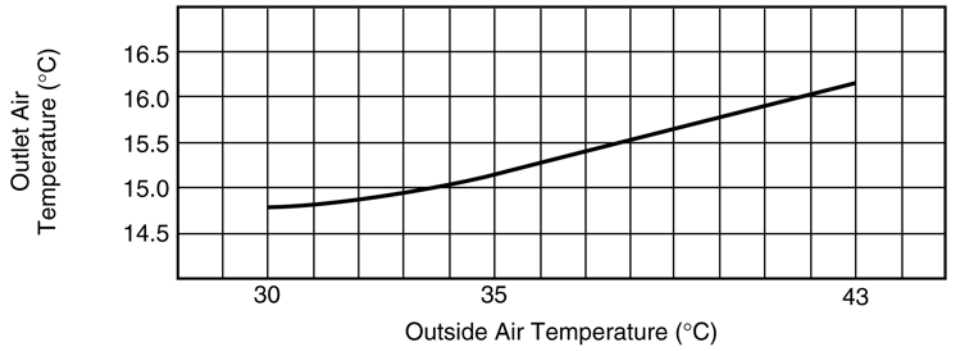
Cooling Characteristic at Different Outdoor Air Temperature

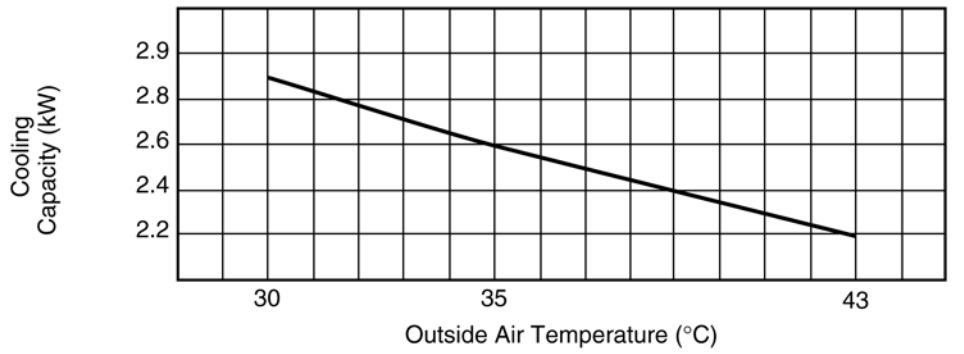
CS-E9EKK CU-E9EKK

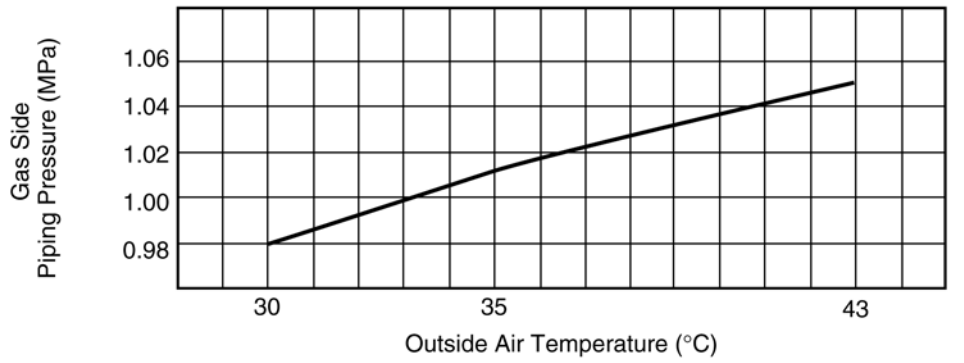
- **Cooling Characteristic**

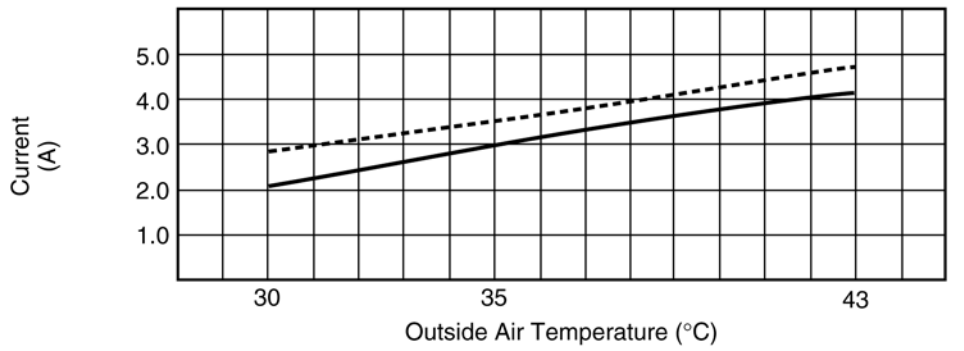
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
—— 230V





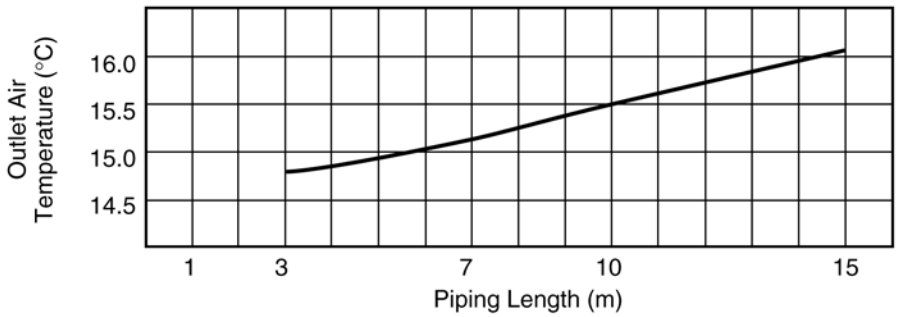


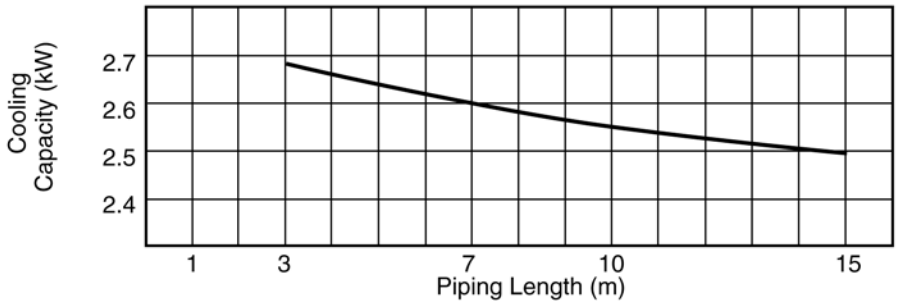


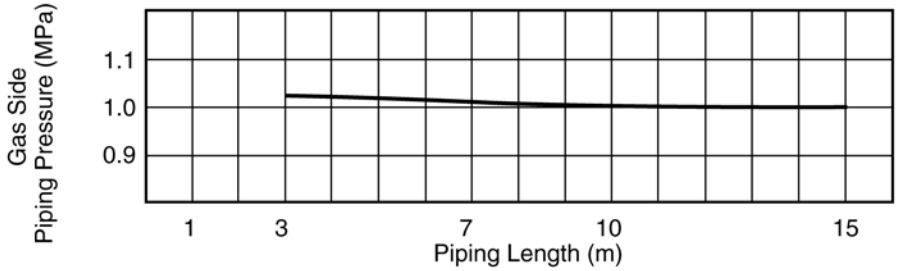
• Piping Length Characteristic (Cooling)

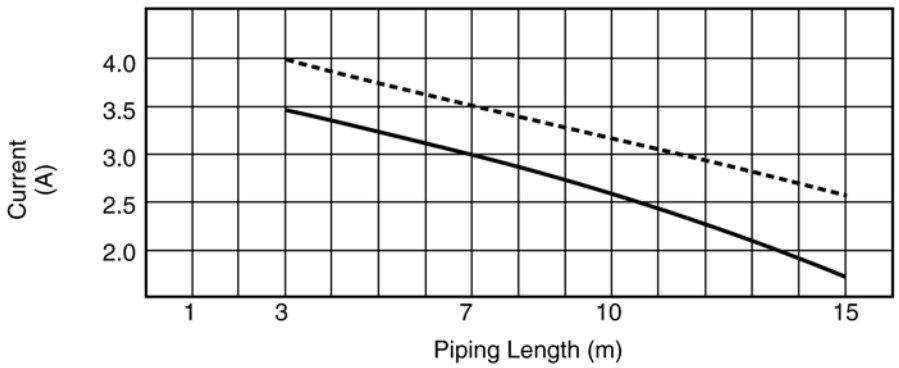
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

- - - - - 208V
——— 230V





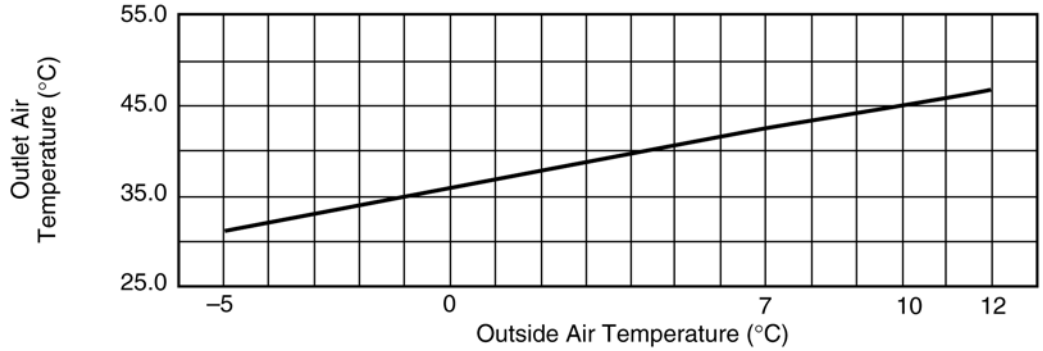


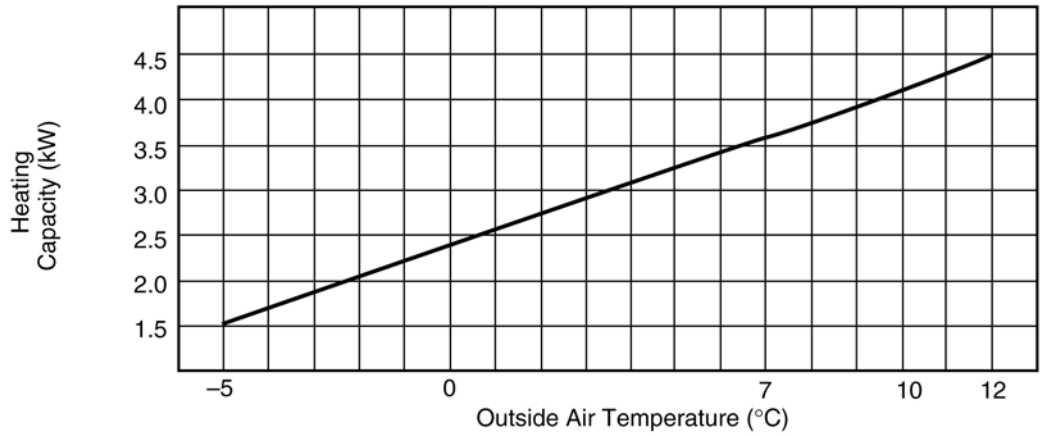


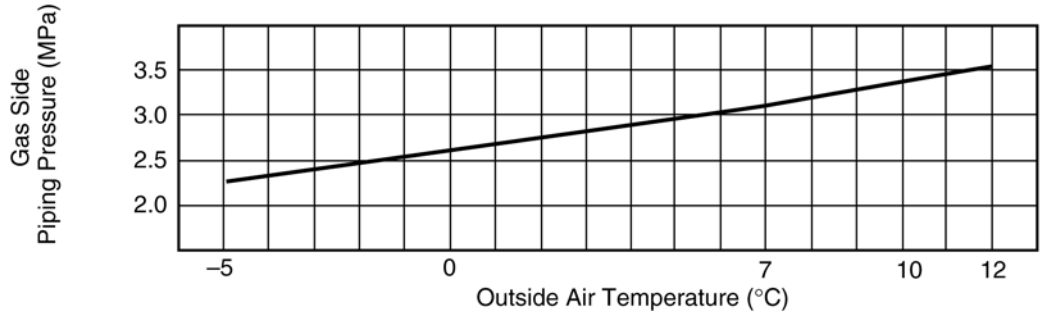
• Heating Characteristic

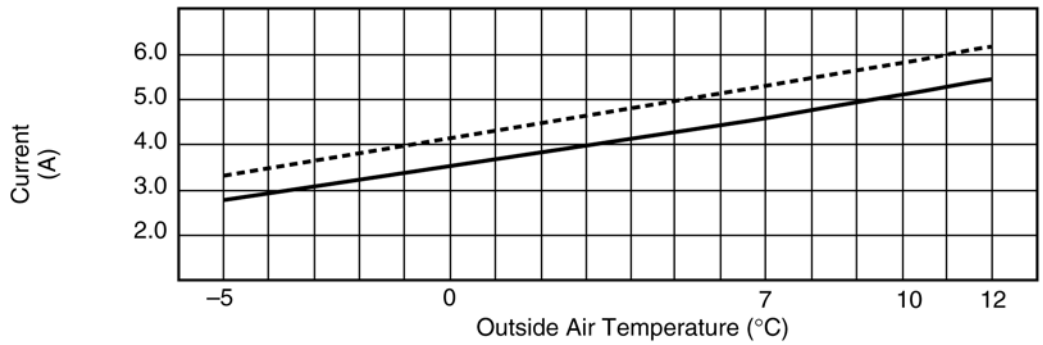
[Condition] Room temperature: 20°C
Heating operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

- - - - - 208V
——— 230V





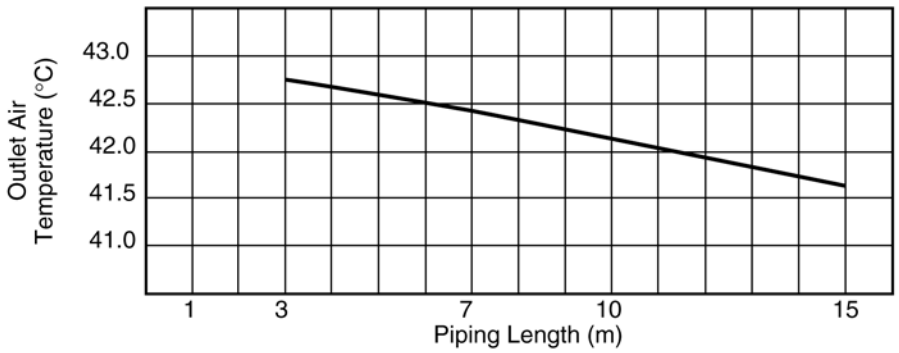


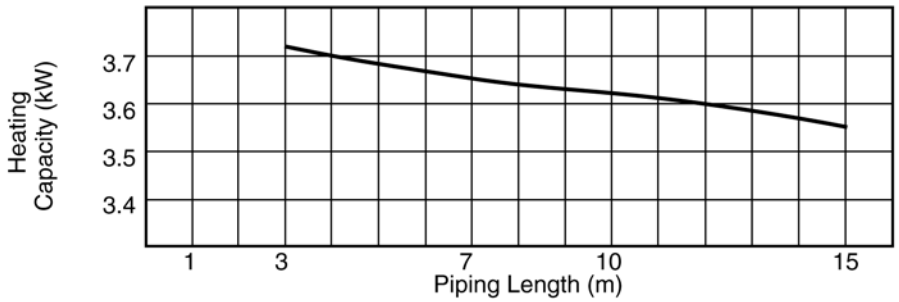


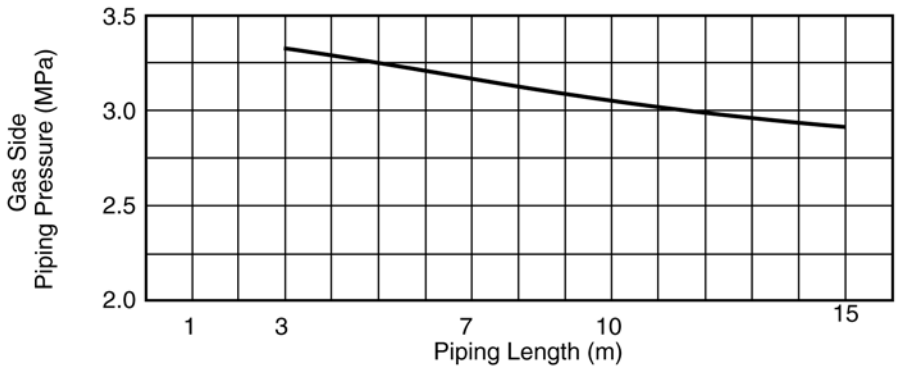
- **Piping Length Characteristic (Heating)**

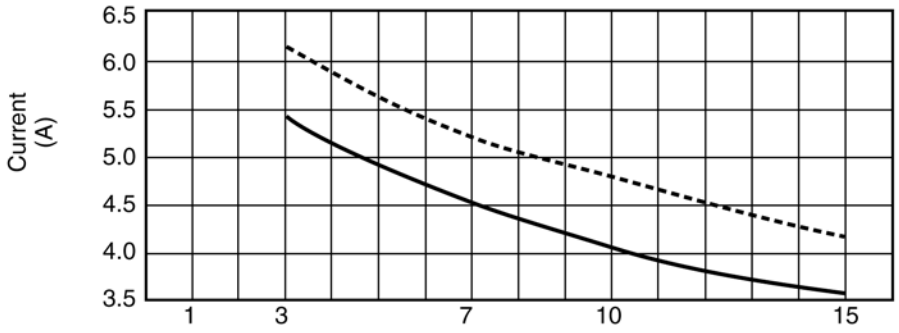
[Condition] Room temperature: 27/19°C
Heating operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
—— 230V







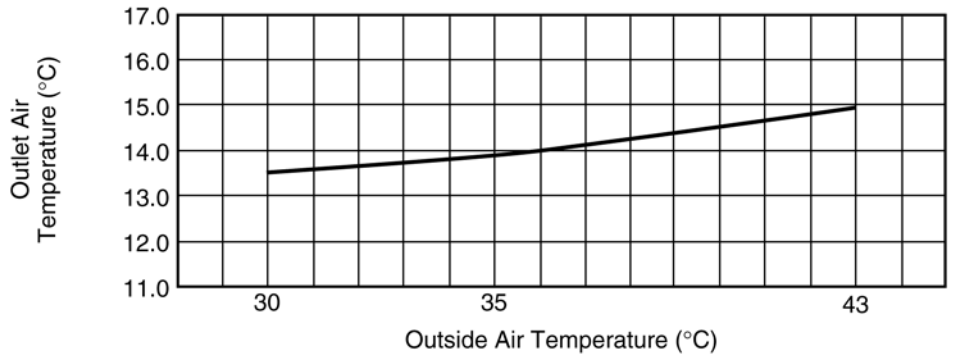


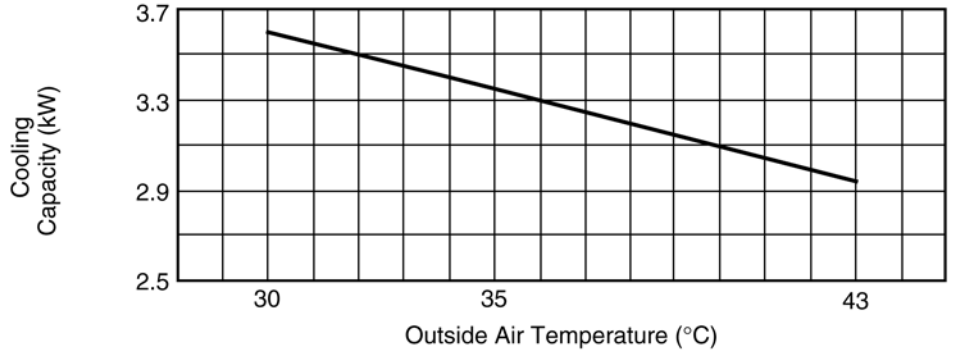
CS-E12EKK CU-E12EKK

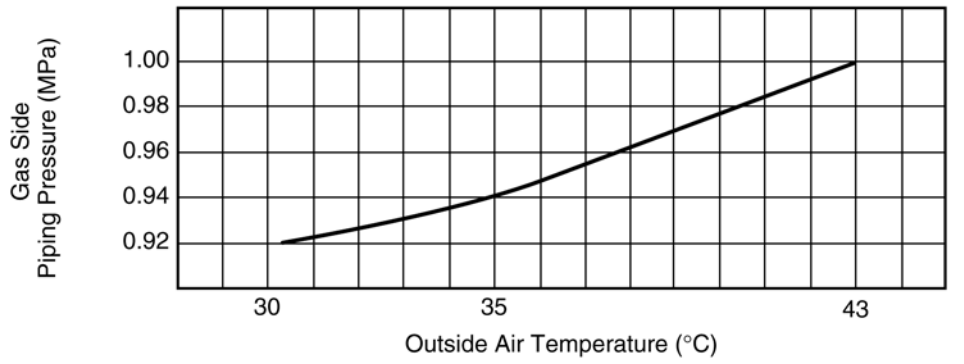
- **Cooling Characteristic**

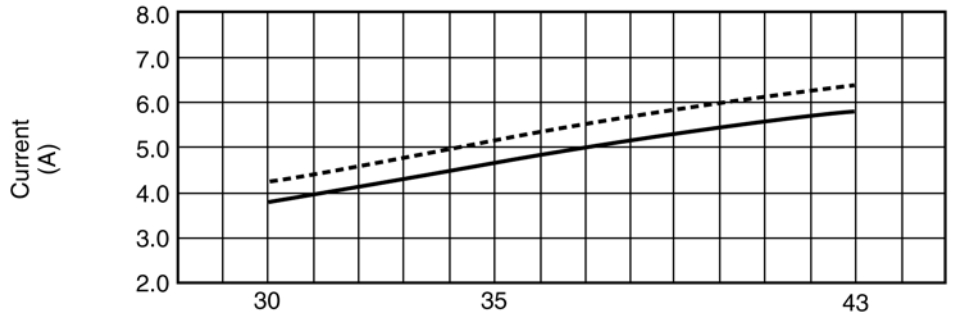
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
—— 230V





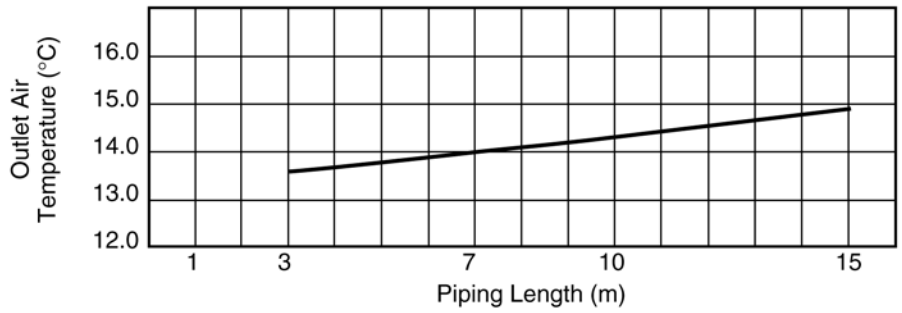


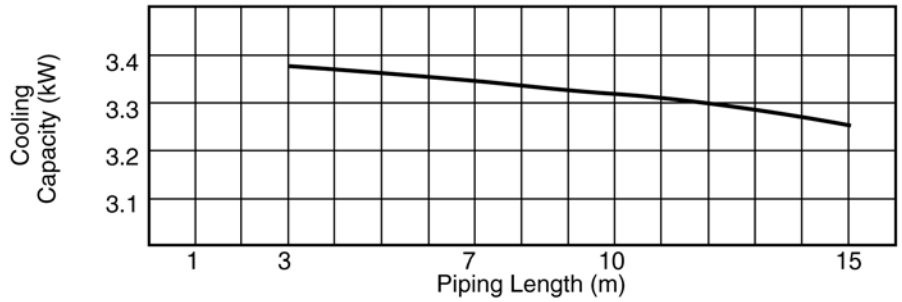


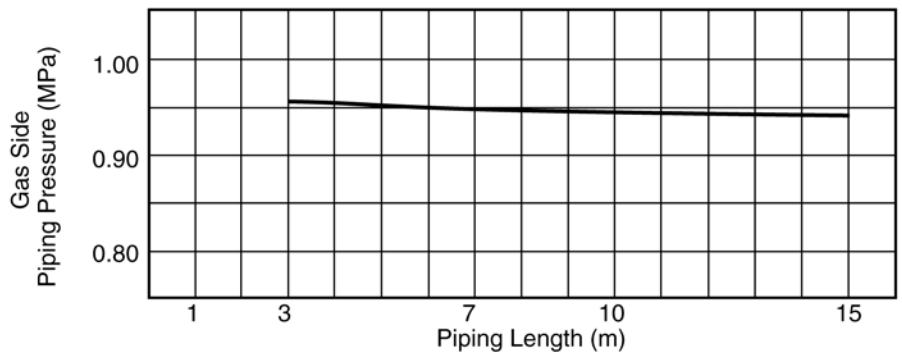
- **Piping Length Characteristic (Cooling)**

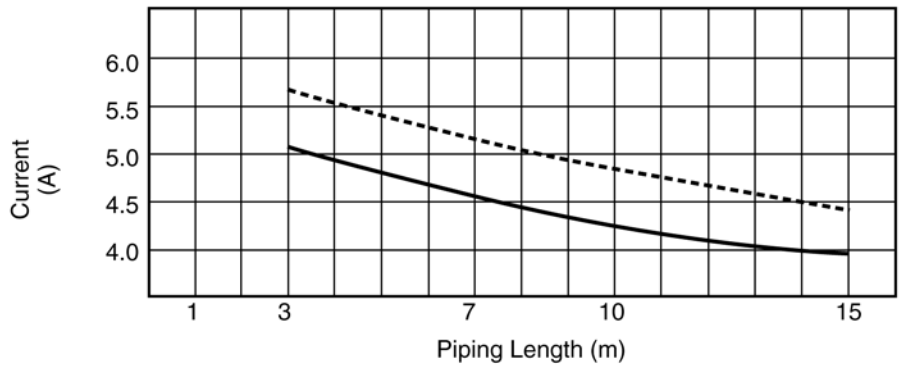
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
——— 230V





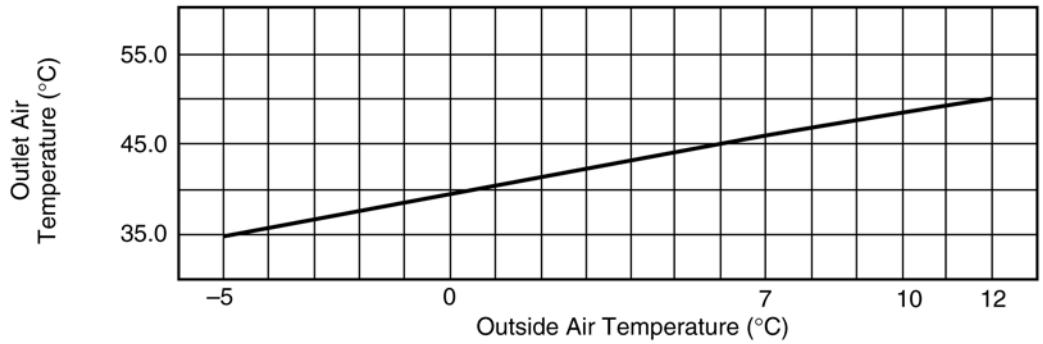


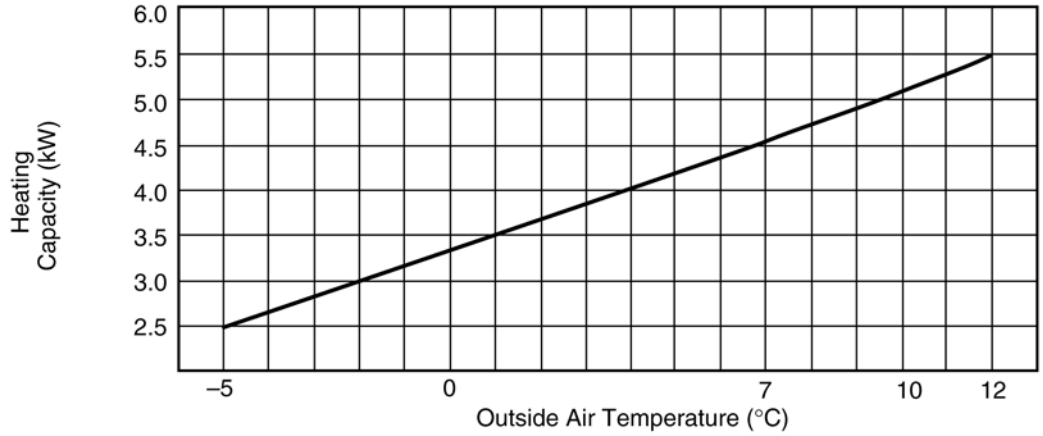


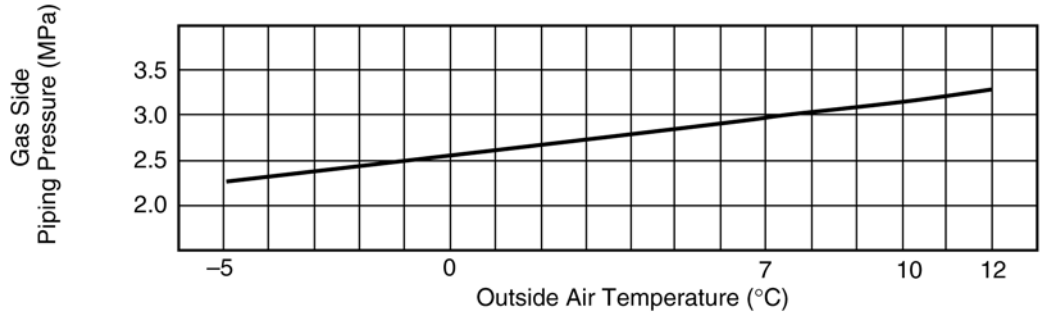
• Heating Characteristic

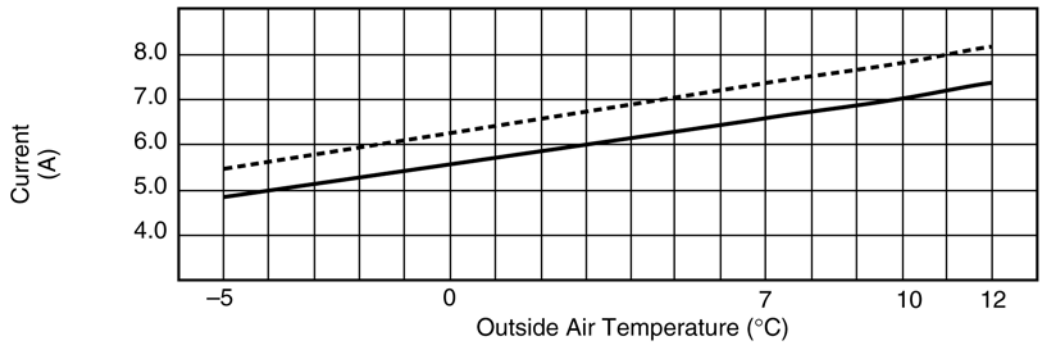
[Condition] Room temperature: 20°C
Heating operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
—— 230V





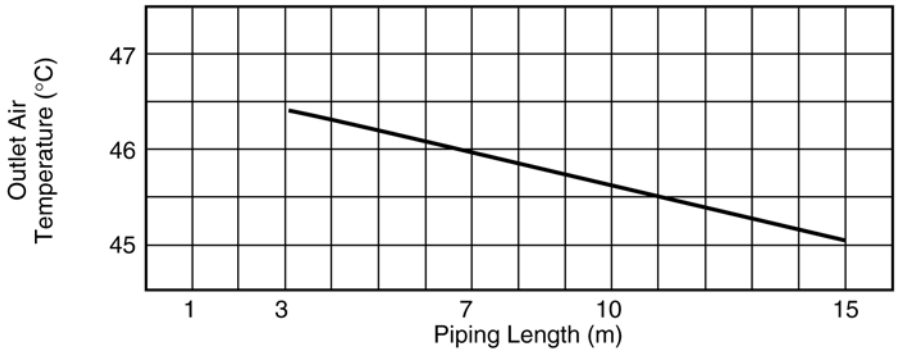


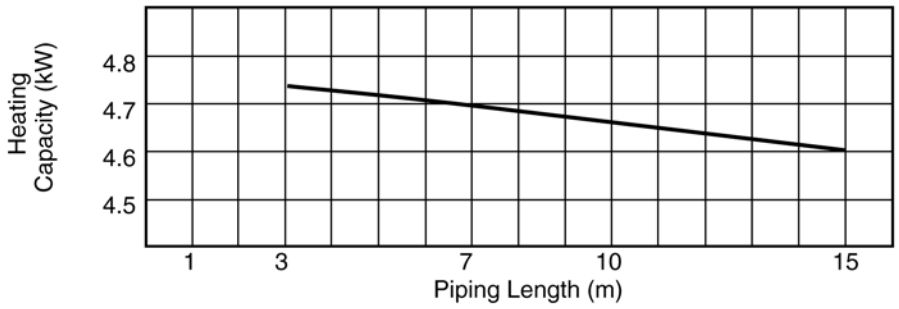


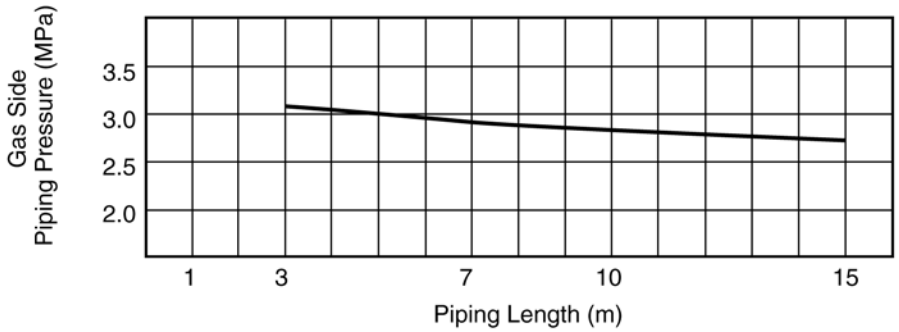
• Piping Length Characteristic (Heating)

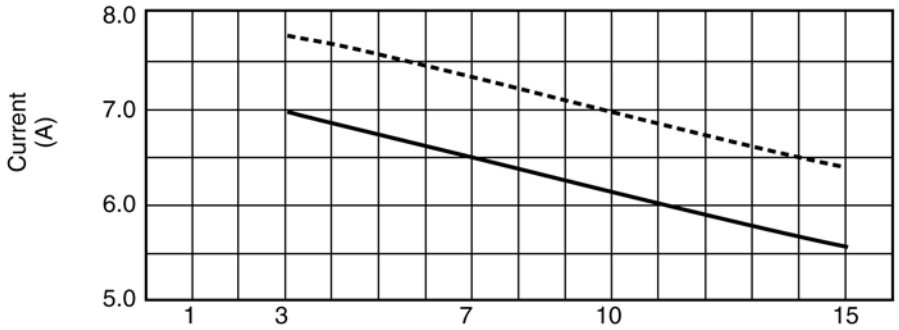
[Condition] Room temperature: 27/19°C
Heating operation: At High fan
Piping length: 7.5 m
Rated Frequency Operation

----- 208V
—— 230V



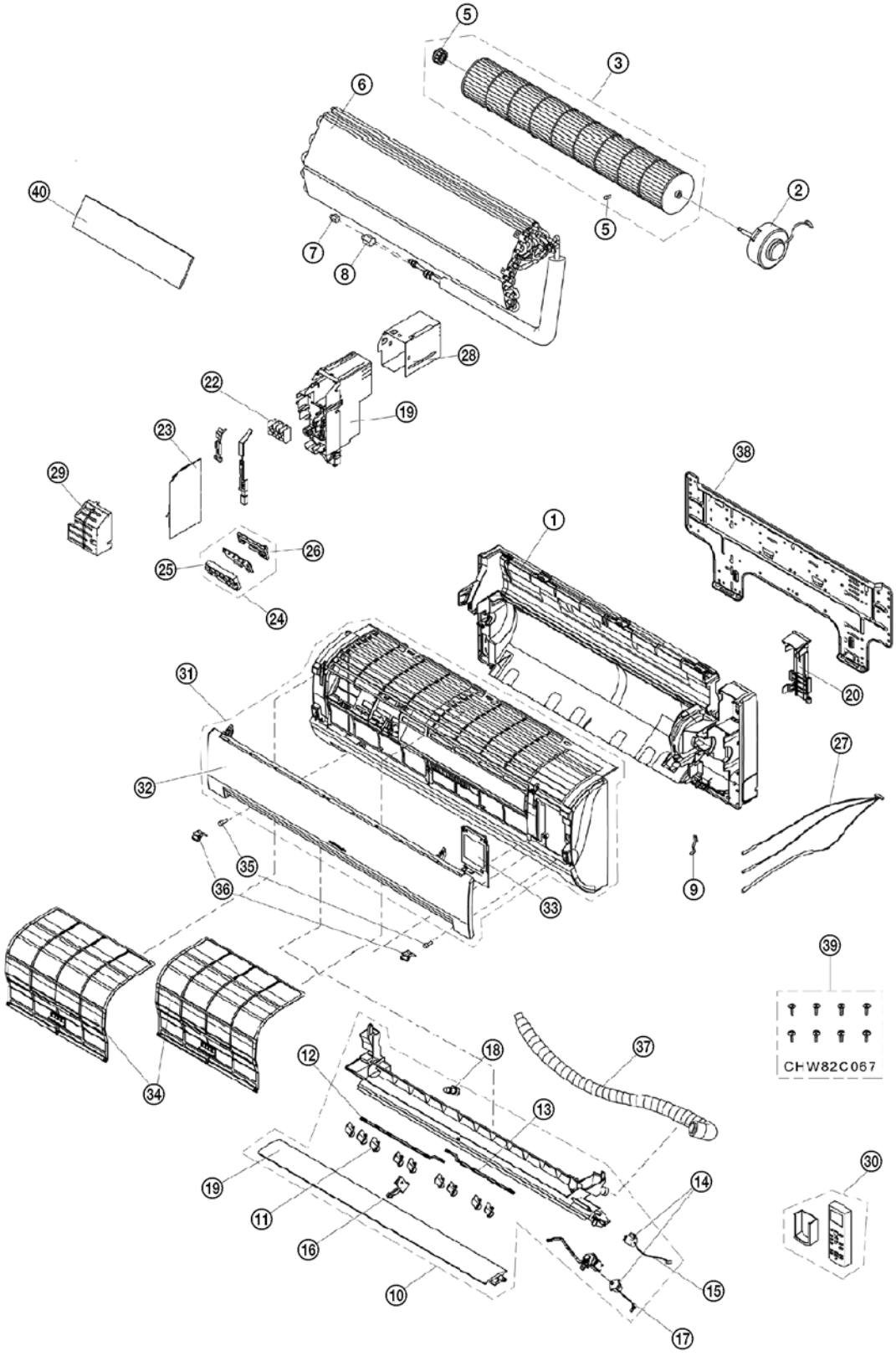






15 Exploded View and Replacement Parts List

15.1. Indoor Unit



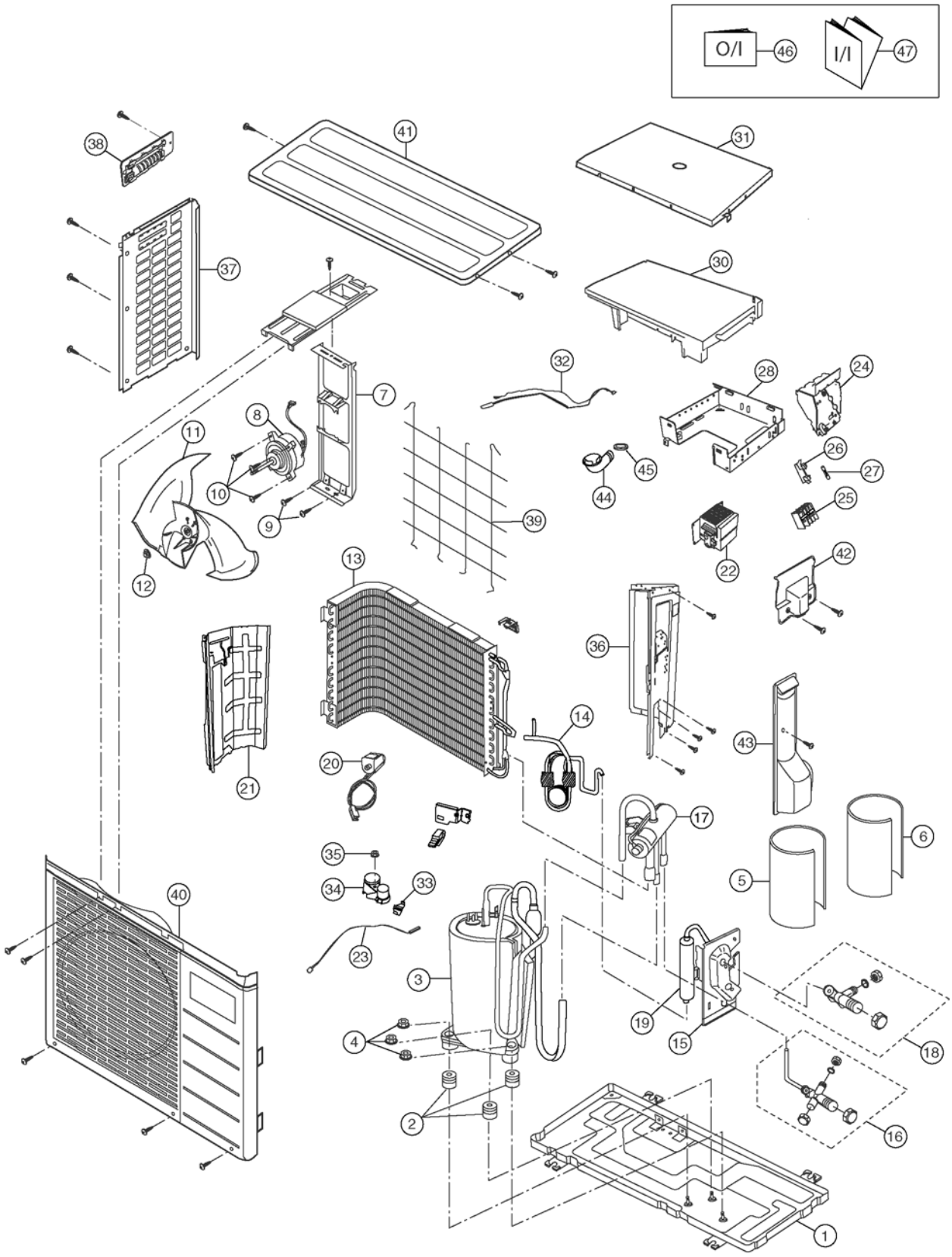
Note
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-E9EKK	CS-E12EKK	REMARKS
1	CHASSY COMPLETE	1	CWD50C1469	←	
2	FAN MOTOR	1	CWA981172J	←	O
3	CROSS-FLOW FAN COMPLETE	1	CWH02C1045	←	
4	SCREW - CROSS-FLOW FAN	1	CWH551146	←	
5	BEARING ASS'Y	1	CWH64K007	←	O
6	EVAPORATOR	1	CWB30C1819	CWB30C1825	
7	FLARE NUT (1/4)	1	CWT251030	←	
8	FLARE NUT (3/8)/(1/2)	1	CWT251031	CWT251032	
9	INTAKE AIR SENSOR HOLDER	1	CWH32143	←	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C2482	←	
11	VERTICAL VANE	9	CWE241150	←	
12	CONNECTING BAR	1	CWE261072	←	
13	CONNECTING BAR	1	CWE261065	←	
14	A.S.MOTORDC SINGLE 12V 300 OHM2	2	CWA98260+MJ	←	O
15	LEADWIRE - AIR SWING MOTOR	1	CWA67C3849	←	
16	FULCRUM	1	CWH621046	←	
17	LEADWIRE - AIR SWING MOTOR	1	CWA67C3977	←	
18	CAP-DRAIN TRAY	1	CWH521096	←	
19	HORIZONTAL VANE	1	CWE24C1155	←	
20	BACK COVER CHASSIS	1	CWD932454	←	
21	CONTROL BOARD CASING	1	CWH102259B	←	
22	TERMINAL BOARD COMPLETE	1	CWA28C2082J	←	O
23	ELECTRONIC CONTROLLER-MAIN	1	CWA73C1876	CWA73C1877	O
24	INDICATOR COMPLETE	1	CWE39C1142	←	
25	INDICATOR HOLDER	1	CWD932429	←	
26	INDICATOR HOLDER	1	CWD932430	←	
27	SENSOR COMPLETE	1	CWA50C2135	←	O
28	CONTROL BOARD COVER (TOP)	1	CWH131207	←	
29	CONTROL BOARD COVER (FRONT)	1	CWH13C1120	←	
30	REMOTE CONTROL COMPLETE	1	CWA75C2915	←	O
31	FRONT GRILLE COMPLETE	1	CWE11C3396	←	O
32	INTAKE GRILLE COMPLETE	1	CWE22C1154	←	
33	GRILLE DOOR	1	CWE141073	←	
34	AIR FILTER	2	CWD001144	←	
35	SCREW FOR FRONT GRILLE	2	XTT4+16CFJ	←	
36	CAP FOR FRONT GRILLE	2	CWH521109	←	
37	DRAIN HOSE	1	CWH851063	←	
38	INSTALLING HOLDER ASS'Y	1	CWH361067	←	
39	BAG COMPLETE FOR INSTALLATION	1	CWH82C067	←	
40	SUPER ALLERU BUSTER FILTER	1	CWD00C1132	←	O

(NOTE)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

15.2. Outdoor Unit



Note
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY.	CU-E9EKK	CU-E12EKK	REMARKS
1	CHASSY ASS'Y	1	CWD50K2081A	←	
2	ANTI-VIBRATION BUSHING	3	CWH50077	←	
3	COMPRESSOR	1	5RS102XBC01	←	
4	NUT-COMPRESSOR MOUNT	3	CWH56000J	←	O
5	SOUND PROOF MATERIAL	1	CWG302293	←	
6	SOUND PROOF MATERIAL	1	CWG302292	←	
7	FAN MOTOR BRACKET	1	CWD541030	←	
8	FAN MOTOR	1	CWA951466	←	
9	SCREW - FAN MOTOR BRACKET	2	CWH551060J	←	
10	SCREW - FAN MOTOR MOUNT	3	CWH55252J	←	O
11	PROPELLER FAN ASS'Y	1	CWH03K1006	←	
12	NUT - PROPELLER FAN	1	CWH56053J	←	
13	CONDENSER	1	CWB32C1737	←	
14	TUBE ASS'Y CO (CAP./CHK VALVE)	1	CWT01C3257	CWT01C3258	
15	HOLDER-COUPLING	1	CWH351015A	←	
16	3 WAYS VALVE(GAS)	1	CWB011374	CWB011344	O
17	4 WAYS VALVE	1	CWB001058	←	O
18	2-WAYS VALVE(LIQUID)	1	CWB021301	←	O
19	DRYER	1	CWB101017J	←	
20	V-COIL COMPLETE	1	CWA43C2233	←	O
21	SOUND PROOF BOARD	1	CWH151025B	←	
22	REACTOR	1	CWA421050	G0A193M00001	O
23	SENSOR COMPLETE	1	CWA50C2340	←	O
24	CONTROL BOARD	1	CWH102273A	←	
25	TERMINAL BOARD ASS'Y	1	CWA28K1154	←	O
26	FUSE HOLDERS	1	K3GB1PH00016	←	
27	FUSE	1	K5D203BK0001	←	
28	CONTROL BOARD	1	CWH102114A	←	
29	CONTROL BOARD	1	-	-	
30	ELECTRONIC CONTROLLER-MAIN	1	CWA73C1910R	CWA73C1911R	O
31	CONTROL BOARD COVER	1	CWH131104	←	
32	SENSOR COMPLETE	1	CWA50C2353	←	O
33	HOLDER SENSOR	1	CWH321010	←	
34	TERMINAL COVER	1	CWH171001	←	
35	NUT-TERMINAL COVER	1	CW7080300J	←	
36	CABINET SIDE PLATE CO.	1	CWE04C1070	←	
37	CABINET SIDE PLATE (LEFT)	1	CWE041044A	←	
38	HANDLE	1	CWE161010	←	
39	WIRE NET	1	CWD041054A	←	
40	CABINET FRONT PLATE CO.	1	CWE06C1142	←	
41	CABINET TOP PLATE	1	CWE031018A	←	
42	CONTROL BOARD COVER	1	CWH131110	←	
43	CONTROL BOARD COVER	1	CWH13C1064	←	
44	L-TUBE	1	CWH5850080	←	
45	PACKING-L.TUBE	1	CWB81012	←	
46	OPERATING INSTRUCTION	1	CWF565065	←	
47	INSTALLATION INSTRUCTION	1	CWF612881	←	

(NOTE)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

[PHAAM] Printed in Malaysia
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